THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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Hacking incidents have not spurred insurance companies to write policies covering the problem. **Page 4.**

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The long wait for practical optical storage may be winding down. **Page 25.**

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New Jersey Bell is the first divested Bell phone company approved to offer an X.25 protocol conversion service. **Page 10.**

■

The much-heralded marriage of Applied Data Research, Inc. and Ameritech is a *fait accompli* following stockholder approval of the acquisition last week. Ameritech reported that nearly 4.4 million ADR shares were tendered at $32 per share, exceeding the 3.7 million share minimum needed to acquire the company. The tendered shares represent some 59% of ADR's outstanding stock, and Ameritech will begin payment on them immediately.

■

Apple Computer last week said it expects profits from the current quarter to reach an all-time high, despite lower sales than the year-earlier quarter. The company said it expects profits in the range of $52 million for the first quarter of fiscal year 1986. Apple President John Sculley said the predictions indicate the company can become significantly more profitable on flat revenue

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Staff, system woes tax IRS

By Mitch Betts

WASHINGTON, D.C. — Tax return processing at Internal Revenue Service computer centers should avoid 1985's legendary snafu this coming tax season, but the IRS still faces significant personnel, management and hardware problems, a congressional panel was told last week.

Perhaps the biggest problem is the extreme difficulty the IRS service centers have had in hiring and keeping experienced computer and data entry personnel, according to the IRS and other government officials. The problem will get worse if the IRS is hit by budget cuts next year, warned U.S. Rep. J. J. Pickle (D-Texas), chairman of the U.S. House of Representatives Ways and Means Committee's Subcommittee on Oversight.

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MIS wish lists may go unfilled

Software productivity tools, networking aids top '86 needs

By Clinton Wilder

Like millions of others at this time of year, DP/MIS managers such as Michael Luciuk are given to itemizing dreamily the gifts they would like to receive to make their professional lives more pleasant next year.

Unlike many others, however, DP/MIS managers' Christmas wish lists this holiday season are more wish than list.

"If anyone were to give me a Christmas present, it would be that the vendor community would get together on some broad

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Users attack 1-2-3 move; Lotus shrugs

By Peggy Watt

Angered by pressure from Lotus Development Corp. to replace their familiar version of the 1-2-3 spreadsheet at a high cost in dollars and inconvenience, microcomputer managers at some major corporations are lobbying Lotus to reconsider its upgrade policies.

"I say, bring back 'classic Lotus,' just like Coca-Cola brought back Classic Coke," said Alan Gross, president of the Manhattan-based Microcomputer Managers Assocation and micro manager of a major New York investment brokerage house. Gross, like others interviewed by *Computerworld* last week, said his company would now take a closer look at alternative spreadsheet packages.

Such complaints come from "a small, disproportionately vocal group," Lotus President Jim Manzi responded. "More micro managers are saying that they like the upgrade, and they have committed to buy many thousands of copies." Asked about requests to continue shipping the earlier release, he said, "We're not running into that at all."

Release 2 of the spreadsheet features such advances as unlimited spreadsheet size, expanded memory capacity, keyboard macros and coprocessor support, other Lotus officials pointed out. Concurrent with the firm's first shipments of the new release three months ago, it stopped delivering the enormously popular 2-year-old Release 1A.

But rather than applaud the new features, Gross and many colleagues object to the tedious task of converting a significant installed base. They also expressed concern over compatibility between files created under each version, especially during the transition. Additionally, they described the upgrade's price as insult added

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CW EXCLUSIVE

High-test blend: Texaco, Getty merge DP centers

By James A. Martin

HOUSTON — While lawyers for Texaco, Inc. waged legal battle in a Houston courtroom regarding the company's $10 billion megamerger with Getty Oil Co., DP managers for the two oil giants were embroiled in a behind-the-scenes battle of a far different sort.

Company lawyers recently lost the initial round in their epic confrontation with Pennzoil, Inc., another Getty suitor. Pennzoil won a $10.53 billion jury judgment that could push Texaco into Chapter 11 bankruptcy proceedings unless a compromise settlement is reached. Meanwhile, the computer professionals have so far been successful in their efforts to combine the two sprawling DP operations at Texaco and Getty into a single state-of-the-art organization that will provide the functional foundation for the merged companies' corporate operations.

Hutzelman

Following the merger, management decided that two central computing centers and one systems test location were needed to accommodate approximately 12,000 on-line domestic and international users. Part of the strategy behind combining the DP centers was to phase out older technology, including IBM 3033 and 3080 systems, in favor of newer 3090 processors [CW, Sept. 2] and more advanced 3380 disk drives and 3480 cartridge tape systems.

"The idea," said David W. Hutzelman, director of technology and planning for Texaco's computer and information systems department, "was to pull all the geographically dispersed DP operations together as quickly as possible into a single, coherent, functional entity and to take advantage of new technology along the way."

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NEWSPAPER

Donation of computer expertise valuable gift to nonprofit agencies

By Donna Raimondi

NEW LONDON, Conn. — "My knowledge of computers is what I have to give." That thought helped inspire a U.S. Coast Guard lieutenant from Connecticut to serve his community's not-for-profit agencies with his computer expertise.

Gerard Massad, a computer science instructor who has been with the Coast Guard since 1974, donates his time, software development skills and knowledge of personal computing to help agencies get organized. He wants to see the idea of community computing catch on nationwide.

Places like the Ronald McDonald House for families of sick children, the Christian Community Action organization, the New Haven Community Soup Kitchen, the Jewish Federation of Southeastern Connecticut and the New Haven Preservation Trust have benefited from work done by Massad and his partner, Jim Glover. Glover, a doctoral candidate in psychology at the University of Connecticut and a computer trainer at Combustion Engineering, Inc. in Windsor, Conn., and Massad recently set up the Center for Community Computing, Inc. in New Haven, Conn.

The two men met by chance in a computer store in New Haven a year ago. After striking up a conversation, each discovered that the other had a desire to help people somehow, but each one needed the support and the motivation that a partner could provide. Together, they have managed to offer consultation, hardware, time on their own computers, training and encouragement to a number of agencies.

Any not-for-profit organization is eligible for help, Massad said. "We don't discuss what the religion, politics or race of an agency is. We will do pro-life or pro-choice. Our purpose is not to decide whether or not they are the right people but if they have a need."

Not-for-profit organizations tend to rely heavily on human resources, Massad said. That is not always the most efficient way to get things done. Computers are much better at keeping lists, creating mailing labels and making multiple copies of a form letter. A personal computer can free up a good portion of an agency's time, he added.

Preston Maynard, executive director of the New Haven Preservation Trust, agreed. "We wanted to computerize, but nobody on our staff of six knew how," Maynard said. The agency had money for hardware but no funds available for consultations. When Massad came in, he helped choose and buy the hardware, and he designed special programs and a data base of historical information for the New Haven Preservation Trust over a period of four to five months.

Massad is currently working on a data base program that will allow the Uncas on the Thames hospital located in New London to keep patient information in a personal computer, instead of on the 2,000 to 3,000 index cards it now uses. His past accomplishments include a one-shot job of creating and maintaining mailing lists of donors who contributed to the Ronald McDonald House in New Haven and a project to help the Jewish Federation of Eastern Connecticut organize a data base.

Massad "helped us select a data base program to use, helped to set up how we should use it and designed the formats for us," said Jerome Fischer, executive director of the Jewish Federation. Fischer found Massad through contacts at the Volunteer Action Center of Southeast Connecticut. The only problem Massad cannot solve for the organization is finding the volunteer labor necessary to enter data in the data base, Fischer said.

"We don't want to have to continually provide support," Massad said. "We want to educate and provide people with equipment."

Trying to get equipment donated is a difficult part of Massad's and Glover's job. "We hope that the tax benefits and the feeling of goodwill toward the community will prompt [vendors and others] to give," Massad said.

The men have applied for grants from IBM, Digital Equipment Corp., Xerox Corp. and others, Glover said. He is putting together a letter to try to interest computer retailers in developing trade-in policies for their customers. The traded-in equipment could then be donated to the center and give the retailers a good tax break at the same time, he said.

Combustion Engineering has donated time in its large training center for training a group of 10 people from the New Haven Commission for Equal Opportunity, Glover said. The Commission owned two IBM Personal Computer XTs and some software for four or five months, but nobody in the office knows how to use them, he explained.

Three months ago the two men sent out an assessment survey to 250 not-for-profit organizations. "The response has been overwhelming," according to Massad. "We even had people call and say, 'Where can I pick up my computer?' "

Corporations or individuals can donate materials on an unrestricted basis, meaning that Glover and Massad will decide where to put them to use, Glover said. Or if the donor prefers, donations can be made to a specific organization or a type of agency, he said.

800-343-6474

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your company? Know any unsung heroes? Heard any hot news about vendors?

If so, we'd like to hear from you. *Computerworld* has established a hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Peter Bartolik, news director.

CORRECTIONS

The correct price of Mathcom, Inc.'s Mathcom Compressor [CW, Nov. 18] is $19,500.

AT&T's homegrown approach to MRPS is called BRPS, the Business Resources Planning System.

The article "Crunch time for software independents" incorrectly listed the name of Computer Associates International, Inc.'s integrated data center management system. It is called CA-Unicenter.

There has been no announcement to date from AT&T regarding an agreement with Ing. C. Olivetti & Co. to produce an IBM-compatible laptop computer as was stated in "Tandy plays hardball in IBM's Personal Computer park" [CW, Dec. 9].

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Optical disk mass storage devices have become more visible/ **25**

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Although the holiday season will bring more good news than bad to personal computer manufacturers, analysts remain mixed about the outlook for Apple, Commodore and Tandy, the companies most affected by holiday sales/ **41**

Paradyne and seven of its officials were indicted for conspiring to bribe U.S. officials and defraud the Social Security Administration regarding a $115 million contract/ **41**

The national Software Publishers' Association snubbed a colleague, viewing the firm as a piracy promoter, and denied the company certification under its gold award honoring best-selling software/ **41**

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PAGE ONE ILLUSTRATION BY ALAN D. HOPKINS

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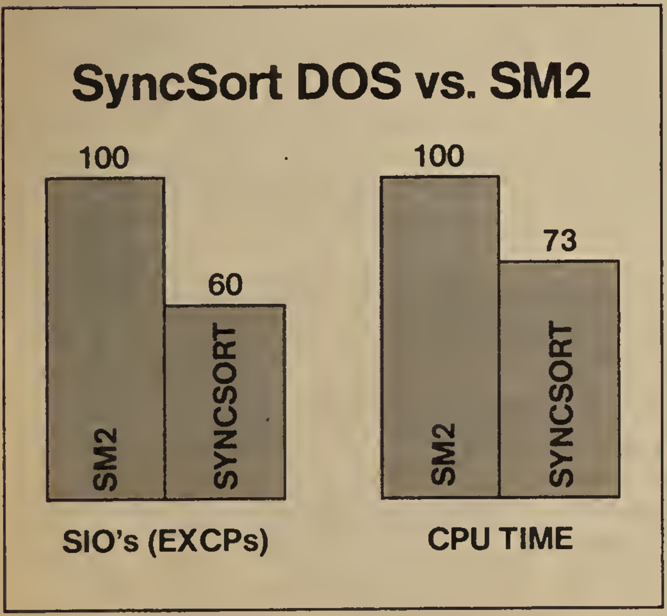

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Firms run into obstacles to insure MIS data

Most believe size of premiums unjustified

By Paul Korzeniowski

Amid the mounting concern over computer security and hacking incidents, a number of corporations are groping with the issue of providing adequate and cost-effective insurance to cover damage to information resources.

"I'm really not very comfortable with the level of insurance coverage we have," said Dan Wertz, risk manager at Boise Cascade Co., the Boise, Idaho-based conglomerate. "We simply try to keep our coverage at a level that is consistent with other companies in the same business."

Executives at Boise and many other companies understand that information represents a key corporate resource, and they want to protect it. But they are struggling to determine how much that asset is worth and how much money should be paid to insure it.

Technical advances opened corporate doors to adolescents equipped with home computers, and in a few celebrated cases, large corporations lost substantial amounts of money. Spurred by those incidents, many corporations examined their insurance coverage to see if such losses were covered. The companies found a void between what their policy covered and what they could possibly lose.

Approximately two years ago, companies such as Lloyds of London and Shand Morahan & Co., an insurance company based in Evanston, Ill., tried to fill this void with a special type of coverage, called unauthorized access or third-party fraud insurance.

William Bramer, currently a security analyst at Arthur Andersen & Co. in Los Angeles, helped to write the Lloyds policy. He said in a recent interview that Lloyds predicted a large, lucrative market would exist for this kind of coverage.

To date, that large market has failed to materialize, and only 70 companies, primarily large financial institutions, have the new coverage. "Companies do not seem to be as concerned about third-party fraud losses as one might expect," Bramer said.

Shand Morahan began to offer its policy a few years ago, and interest has been only sporadic. "There were peaks and valleys," noted Shand's Terri Moss-Lesser. "Interest rose a few months after *War Games* was released. Also, whenever there was a celebrated computer hacker case, we received a lot of telephone calls. At other times, there didn't seem to be much interest."

Shand Morahan, like most insurance companies, did not have a good year in 1985. As a result, the company has stopped writing all new policies. Moss-Lesser stated that Shand plans to write new unauthorized access policies when the freeze is lifted. Insurance analysts said, however, that the company has permanently dropped the coverage because it was not making enough money.

A principal reason for the lack of interest in the new coverage has been its very large premiums. In some cases, they run as high as 1% to 4% of a company's total revenue, according to insurance analysts.

"Most companies do not think that

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Staff, system woes tax IRS

From page 1

Lengthy delays in processing tax returns, refunds and correspondence occurred due to various problems with a computer modernization program, which replaced outdated CPUs with Sperry Corp.'s Univac 1100/82 processors running software that was converted from assembly language to Cobol [CW, April 15].

After a major investigation, the U.S. General Accounting Office (GAO) attributed the 1985 processing problems to late delivery of the computers and tape drives, slow Cobol programs written by inexperienced programmers and inaccurate data entry by inexperienced employees.

The GAO also found that computer programs either did not contain good checkpoint routines or contained no checkpoint routines at all. As a result, programs that failed had to be rerun from the beginning instead of from the checkpoints.

At a subcommittee hearing chaired by Pickle, officials testified that the agency has taken numerous steps to fix the computer and management problems that caused the processing backlog. For example, the IRS has rewritten the slow Cobol programs and increased the systems capacity at the service centers with 20 new Sperry computers, officials said.

Several remaining problems

But the GAO identified several remaining problems. The auditors questioned whether the IRS can eliminate its backlog of unresolved tax cases by the end of the year and pointed out that the IRS lacks a central DP office to administer its computer replacement programs.

The GAO also expressed concern that replacements for 14-year-old Sperry front-end processors have been delayed, and additional disk drives and disk controllers will not be delivered until March 1986.

M. Eddie Heironimus, associate IRS commissioner for data processing, responded that Sperry has been "extremely responsive" in providing backup front-end processors when necessary. Concerning the disk drives and controllers, Heironimus said, the extra units will not be needed in 1986.

"I hear you, and I hope you're right," Pickle said. "If not, we're going to have you back up here on the carpet," he said.

The personnel problems, such as low pay and undesirable working conditions, are likely to continue to some degree in 1986, the GAO added. A Sperry audit in early 1985 showed eight of the 10 data centers did not have enough program analysts to oversee computer runs, and many IRS officials complained of inexperienced data entry personnel, the GAO noted.

IRS officials attributed the personnel problems to inflexible work hours, the seasonal nature of the work, unattractive compensation and benefits, job stress due to performance standards and entry-level salaries that were often lower than those offered by local fast-food restaurants.

IRS Commissioner Roscoe L. Egger Jr. confirmed that there is a very high turnover in personnel at the service centers and said the 1986 staff will be very inexperienced. He put some of the blame on budgetary restraints. "For example, we need more trained operators in our computer rooms — 24 hours a day, seven days a week — to fix glitches when they occur," Egger said.

Pickle warned that the recently enacted deficit-reduction legislation, the so-called Gramm-Rudman bill, is likely to force the IRS to take more budget cuts. However, Egger said he hopes the IRS will be immune from such cuts and perhaps will get budget increases since it is the IRS that collects tax revenue to reduce the federal budget deficit.

"Well, now you're engaging in wishful thinking," Pickle retorted.

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Obstacles to insuring data

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the premiums are justified," security analyst Bramer said. He added that some of the country's largest banks are so dissatisfied with the high premiums that they are exploring the possibility of supplying their own coverage.

Companies may have a basis for their dissatisfaction. Despite the hoopla about computer hackers, not one of approximately a dozen insurance experts contacted by *Computerworld* could identify a single unauthorized access claim filed in the last few years. Usually, few claims bring low premiums. Yet, this is not the case with unauthorized access insurance.

Most insurance companies are being extremely cautious with the new coverage. "Because the coverage is so new, most companies are unsure of the type of risk that is involved," noted Marv Haack, product manager for electronic information technology at St. Paul's Companies, Inc., a St. Paul, Minn., insurance company. "Insurance companies will not write this type of policy without setting a very high premium."

The technology involved presents another problem. Insurance companies think that evaluating a company's security procedures and determining if they are adequate to safeguard a company's information resources is almost impossible. "With computer technology rapidly advancing, a number of companies just refuse to get involved with this type of coverage," Haack said.

Also, because of recent insurance industry woes, few insurance companies have the revenue needed to add new types of coverage. Those with the cash have been reluctant to increase their types of coverage.

Thus, only half a dozen companies supply unauthorized access insurance, and they are free to set premiums as high as they wish.

The few suppliers carefully choose their customers. Haack reported that St. Paul's offers its coverage to only half a dozen corporations.

To cope with technical change, St. Paul's hires a security consultant to evaluate a client's procedures. The product manager reported that a number of companies mistakenly think that this coverage is a replacement for adequate security procedures. Often, the consultant recommends that coverage not be granted because the potential client's procedures are so poor.

There is also a question of what the new insurance covers. Many companies incorrectly believe that their current disaster recovery insurance policy covers unauthorized access claims.

Most companies have disaster recovery insurance. Typical claims occur when a fire destroys a data center or software malfunctions and accounts receivable are lost. Usually, the policies pay for computer equipment and the time needed to restore the system to its prior operating capabilities.

But if a hacker accessed a system and destroyed a number of corporate files, it is not clear a company's disaster recovery insurance would cover the loss. "No one can be sure," Bramer noted. "That is one of the problems with insurance coverages. There are few clear-cut cases."

Usually, companies find out what their policy covers only after a claim has been filed. When hackers broke into data bases at a financial service bureau a few years ago, an alarm was sounded in that industry and similar corporations added unauthorized access coverage. To date, the financial industry has generated most of the interest for unauthorized access coverage.

Yet, other companies may also be at risk. For example, a competitor could break into a manufacturer's data base and steal its trade secrets. The company may have no coverage.

Analysts said that only when that type of incident occurs will other industries demonstrate an interest in unauthorized access coverage.

Burroughs multiuser units out

DETROIT — Burroughs Corp. continued to round out its line of distributed processing computers with the introduction last week of two models of a multiuser microcomputer that can support up to 12 intelligent workstations.

The B28 features an Intel Corp. 80286 microprocessor running at a speed of 8 MHz, a 12-in. monochrome monitor, two RS-232 ports, a parallel port, an RS-422 port used to connect the microcomputers, Burrough's BTOS operating system and support for up to eight users.

Designed in modular fashion, the system can be expanded, in 1M-byte increments, to include up to 4M bytes of random-access memory; 10M-, 20M- and 40M-byte hard disk drives; graphics terminals; a word processing keyboard; and support for 12 users. The B28-MCP works with an Intel 80287 math coprocessor and can process floating-point calculations 40 times faster than the base model.

The product can run application software designed for other Burroughs machines. On the low end of the product line, Burroughs B25 supports up to five workstations. At the upper end, the company's XE 520 workstation works with up to 64 microcomputers.

The price for a B28 equipped with an 80286 microprocessor, BTOS, a 12-in. monochrome monitor and the various ports is $5,130.

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MIS wish lists may go unfilled

From page 1

communications standards,” Luciuk, manager of systems and services for Exxon Corp.'s Communications and Computer Science Division told *Computerworld* in a year-end survey of computer managers designed to ascertain their expectations for the coming year.

“That won't happen in 1986, though,” he added. “We want compatibility on a corporate basis, but there are a lot of local reasons for choosing a particular vendor. The trick is finding some basic compatibility to interchange documents,” Luciuk said.

'Like an erector set'

Dan Cavanagh, senior vice-president of DP at Metropolitan Life Insurance Co. in New York echoed that opinion: “Some of the products that are out there now do part of the job of networking micros to each other and to the mainframe, but it's like an erector set. My Christmas wish is for someone to put the parts of the erector set together for me.”

The specter confronting Luciuk, Cavanagh and their colleagues is variously described as the personal computer revolution, the rise of end-user computing, the search for network solutions, or — the MIS managers' seeming favorite — effecting distributed processing.

Whatever the label, the heavy burden of solving the connectivity puzzle has been blamed by analysts as the cause of the 1985 computer industry downturn and cited by MIS managers as their most formidable challenge of 1986.

Key to solving the challenge, said Tim Gallagher, MIS director at Nashua Corp., in Nashua, N.H., is hardware independence. “My wish is for a single workstation that could access the network through software and be transparent to the end user. IBM's Systems Network Architecture is getting there, but unfortunately it's not cheap, and you still have to upgrade your control unit to use it,” Gallagher said.

The network solution Santa Claus will most probably come wearing IBM-blue pinstripes or some other major corporate attire, according to Bob Capone, senior vice-president and director of technical operations at J. C. Penney Co. in New York. “It has to be done by the IBMs, NCRs and AT&Ts of the world,” Capone said. “It's not just a simple software solution, and it won't be solved overnight.”

ILLUSTRATION BY ROB SAUNDERS

Capone said he is encouraged by a greater industry focus in the right direction, which he partially attributes to the 1985 computer slump. “The need has really been there all along, but vendors have given it more attention this year,” he said. “If we had had better communications solutions, we would have bought more this year, particularly in the personal computer area. The lack of that capability has certainly acted as a deterrent for us.”

Most users hailed IBM's recent Token-Ring network announcement, although more as a step toward a micro networking standard than for the attributes of the IBM product itself. “I think it will become a de facto standard like Systems Network Architecture,” Cavanagh said. “Some vendors who were not sure what they would do will at least go ahead to be compatible with it.”

While many MIS departments face the challenge of implementing the best network technology to satisfy micro user demands, Tom Ardell said he has the opposite problem. Ardell, manager of computer services at John Deere Co. in Portland, Ore., said his shop has incorporated IBM and 3Com Corp. technology into micro-to-mainframe and local-area network solutions, but the micros still sit unused on employees' desks.

“It's the old adage — you can lead the horse to water, but you can't make him drink,” Ardell said. “We've micro-mainframed, local-area networked, personal computered and word processed, and so what? The vendors have done their part; more user response is what we need.”

Things are very different at Agway, Inc. headquarters in Syracuse, N.Y., where MIS Director Bob Woodrow's new year involves what he calls “the most significant technological step this company has ever taken.” Woodrow will soon choose among five vendors for a distributed processing system to connect about 2,000 micros in Agway's 1,200 stores in the Northeast.

“We've been preparing and gearing for it for several years, but recent changes in hardware price/performance make this the time to buy,” Woodrow said. “Once it is installed, the real challenge is one of proper training and education of the users.”

Equaling or exceeding networking solutions on some MIS managers' wish list is a significant leap forward in fourth-generation language and software productivity tools. Most users agreed that fourth-generation languages have not yet met either their own needs or software vendors' promises.

'We lust for productivity aids'

“We lust for productivity aids in the software arena,” said George DiNardo, senior vice-president for information management and research at Pittsburgh's Mellon Bank. “We spend a fortune here chasing them. “All the talk about fourth-generation languages is a lot of smoke. We're looking at a $15 million to $20 million rewrite of our 13-year-old trust system, and there's no product out there to help us enough to justify its price.”

Front-end, natural-language user interfaces also appear to be a hot item users will be seeking in 1986. “We don't expect our top executives to learn new query languages,” said the head of information services at a Boston-area high-tech and defense firm. “Artificial intelligence is an idea whose time has come, but its implementation leaves something to be desired. We've developed many things on Symbolics, Inc. systems, but we're a little disappointed with the slow pace of the rest of the industry.”

“The fourth-generation languages that exist today are just relational data bases with utility tools,” Gallagher said. “The user should be able to type the word 'sales' and get a sales chart on the screen; we need to define data files, integrate new fields and change formats, all in English. There are some packages that do pieces, but you need a pure fourth-generation language to tie it together. And it must bridge from existing structures like CICS so we don't have to build from scratch.”

Also high on Gallagher's new year's wish list is a better pool of job candidates for technical analysis and applications development. For people coming out of college now, their computer science degree “might as well be history or math,” he said. “The colleges don't develop technicians; we're more likely to see people on their way to an MBA degree. We have to trudge our way through the development cycle.”

For the Gas Company of New Mexico in Albuquerque, the new year will bring a complete rewrite of the utility's 8- to 10-year-old applications, most of which were developed in-house. MIS Director Barbara Weaver said that her firm is evaluating several productivity tools to help them do that, including Pansophic Systems, Inc. Gener-ol; IBM's CSP; and other CICS-type tools.

“We have to do a lot of fire fighting,” she said. Weaver's challenge includes a potential future integration with the systems of Public Service Company of New Mexico, which recently acquired the gas firm.

'Best solutions have not been created'

At California First Bank in San Diego, Merrill T. Miller Jr., senior vice-president of central operations, is wrestling with his industry's increasing dependence on continuous on-line services. “The best solution now is to off-load [from the bank's IBM 3083 and 3033] to a fault-tolerant front end such as a Tandem Computers, Inc. system, but I don't particularly like that idea,” Miller said. “I'd like to have it all in one system. In my judgment, the best solutions have not yet been created.”

Whether in banking, insurance, manufacturing or other industries, the issue that will continue to confront nearly all large DP installations is the management of distributed processing.

For Exxon's Luciuk, who refers to his end users as customers, that trend has fundamentally changed the nature of his job.

“Our role is gradually changing into being consultants to our customers,” he said. “Distributed processing is forcing us to deal with far more vendors and options, and we have to know that those vendors will be around in three or four years. It's too easy to select the solution of the month, and then you've let an orphan into your shop. A better understanding of where the market is going is more critical than ever.”

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Oil firm merger: High-test mix

From page 1

The former Getty DP operations in Tulsa, Okla., were expanded to serve as development and production centers for corporate and international users, and Texaco's Bellaire location in suburban Houston was reorganized as a production center for domestic operations. Both now have information centers as well.

The migration paths for work loads, data sets and mainframes from center to center resembled "an elaborate checker game," Hutzelman added. "We started with one new IBM 3084 mainframe in Tulsa and moved some work up for that machine. That freed up another machine, and then we found some work to move to that one, and so forth. For the next nine months, we were involved in moving things around piece by piece."

The strategy called for consolidating mainframes and applications from three Getty computing locations — Los Angeles; Briarpark, Texas; and Tulsa — with those from three Texaco DP facilities, all in the Houston area. The merged companies' 18-month plan for integrating systems began in July 1984, with the majority of migrations completed by year-end 1985.

While embarking on this complicated migration of data sets and mainframes, Texaco's information center in Bellaire became one of the first to install an IBM 3090 Model 200 mainframe. A total of four 3090s were installed within a few months at the two data centers in Tulsa and Bellaire, replacing IBM 3080 and 3033 AP processors.

With IBM's announcement of the 3090 mainframes in February, Texaco DP management decided the new technology would be a cost-effective replacement for several 3080 systems. "Since we had developed such an extensive plan for moving equipment and data around, we just got everyone who was involved in planning back together to decide the best way to use the new equipment," Hutzelman said.

The Sierra models offer vector processing capabilities, but Texaco DP managers had not yet decided to exploit that option. If they do, vector processing would be used for seismic studies and refinery modeling applications.

Texaco is considering upgrading the 3090 200s to quadratic processor Model 400s when those systems become available in late 1986, although Hutzelman said no definitive plans have been determined.

IBM eliminated "most of the trauma" in communicating with the 3090s, said Mike Jones, manager of capacity planning and hardware evaluation. "The main difference [between the 3090 and the 3080 series] is in the channel connection. The channels are not lined up exactly as they were on the 3081, so you cannot use the same hookup arrangement. Because of that, it's important to use backup channels if something happens to go wrong. But that's a very minor change."

Two tasks to accomplish

Before the checkerboard migration of DP operations could begin, two things had to be accomplished, according to Hutzelman. First, Getty's computer center in Tulsa was expanded to serve as one of the two main DP centers for the combined corporation. Second, a communications network was installed so the end users of both companies could access information from any processor within the merged corporation's network.

The 10,500 sq-ft computer room in Tulsa was expanded to 24,900 sq ft to accommodate the additional hardware, according to Jack Anders, manager of systems coordination and computer center migrations. The Tulsa facility was chosen as a DP center because it was "an excellent building with good facilities and was well located with good communications and power grids," Anders explained.

In addition, Getty's Tulsa center provided Texaco with a needed backup facility outside hurricane-prone Houston. "With that in mind, we decided we should expand the former Getty computer center so that it would be capable of being one-half of our total computing resource requirement," Anders said.

Getty had a "very capable group" of DP personnel in Tulsa, he added. "With the high cost of relocating people, it seemed a good idea to move the work to them rather than vice versa."

Construction schedule drafted

A 13-month construction schedule was drafted to expand the Tulsa center, with the first 3084 mainframe migrated from Houston over the 1984 Thanksgiving weekend. "Between July 13 and Thanksgiving, we completed 13 months of construction with various contractors to get the center ready for the first mainframe," Anders said.

To protect the expanded Tulsa center from such DP catastrophes as power outages, a 2,000-kVA uninterruptable power supply system and 3,000 kVA of diesel generator automated backup power were installed. These systems offer detection devices that determine when and if power has been lost and for what duration, and they provide backup power as well.

Aside from expanding the Tulsa center, establishing communications links between the Getty and Texaco terminals was another primary consideration. "The objectives were first to provide minimal connectivity for selected users and then to develop a plan that would allow any terminal to get to any processor anywhere in the network," according to Carlton Wilbanks, manager of data communications.

The first step was to install a

See **OIL** page 9

Texaco, Getty blend DP environments

Prior to the announcement of a merger between Texaco, Inc. and Getty Oil Co. in January 1984, Getty had operated two corporate DP centers (in Houston and Tulsa, Okla.) as well as a systems test facility in Los Angeles, with a total of some 1,600 terminals.

The Houston production center housed an IBM 3081 Model K in an IBM TSO and Software AG Adabase environment for production and exploration applications. The Tulsa center supported an IBM 3081 Model K and an IBM 3033 Model UP in TSO, CICS and batch processing environments for marketing and manufacturing applications. Systems testing applications from Getty's IBM 4341 in Los Angeles were migrated to the IBM 4381 at Texaco's Regency Square facility in Houston.

Getty's DP operations ran under IBM's JES2 operating system and were linked by IBM's Systems Network Architecture (SNA).

At the time of the merger, Texaco operated a total of four data centers within two Houston locations — downtown and Bellaire — in addition to the systems testing facility at Regency Square, a total of approximately 7,000 terminals. At the downtown office, an IBM 3081 Model K and two IBM 3033 Model APs supported a TSO and IMS environment development center. An information center at the same location was supported by a 3081 Model K and a 3033 Model AP in a TSO and Model 204 data base management system environment.

At Bellaire, the production center had an IBM 3084 and an IBM 3033 Model AP for IMS marketing and production applications. The interactive end-user center was supported by an IBM 3084 and an IBM 3081 Model K in an APL/ADRS environment. Texaco's systems, unlike Getty's, ran under the JES3 operating system; the DP centers of both companies were linked by IBM's SNA.

The migration project is scheduled to be complete by early 1986, with the last major phase — migrating development applications once performed on the 3081 Model K and two 3033 Model APs downtown to the 3084 in Tulsa — to be completed by year's end.

When complete, the configurations of Texaco's merged DP operations will include the following in Tulsa: a 3084 with a TSO, IMS and batch environment as a development center, an IBM 3090 Model 200 for IMS and batch production applications and a 3090 for the corporate and international information center TSO and APL users.

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Oil firm merger: High-test blend

From page 8

communications network to solve the problems of addressing incompatabilities and capacity constraints for end users. Both companies had operated under the IBM Systems Network Architecture (SNA) environment, "which was a real plus" in communications planning, Wilbanks said.

The bad news was that the SNA environment allowed a limited number of lines per processor, and "we were far above that limit on at least five of our front ends," said Ron Curtis, manager of communications software. "So we had to off-load lines from 3705s and 3725s to other front ends to go below that limitation, plus bring in some new 3725s," he added.

Duplications were discovered among CPUs when the Getty and Texaco networks were linked. During a July 1984 weekend, both SNA networks were shut down and new Network Control Program and VTAM system generations were loaded into every communications controller and CPU in both networks. Once loaded, a new integrated network that allowed users access to any network processor was activated.

> ***'The intent was when users came in on Monday morning, they would not even know the migration took place.'***
>
> — Kirby Sternfels
> Texaco, Inc.

Once the networks were compatible, two T1-carrier systems were installed to provide sufficient bandwidth. All front ends were equipped with the ability to run Multisystem Networking Facility ties between the two networks via two 56K bit/sec. communications links.

"Once we put the network together, we were hitting the limit on the number of CPUs we had to network," Curtis said. "We had so many CPUs and front ends that we had come to both limits. To help us get out of that problem, we are planning to implement Extended Network Addressing software."

Application migrations followed in the wake of mainframe realignment. To accomplish this with a minimum of complications, data sets were assigned a weekend migration date. End users were then asked to identify their data sets and to determine if and when they could be moved before the assigned date.

"We made the assumption that a good amount of all data had not been accessed in the last 30 days. That turned out to be a good assumption and allowed us to move data ahead of time," according Kirby Sternfels, manager of change control.

Up to 90% of all TSO data to be moved on a particular weekend was already in the receiving center by Friday afternoon, at which time the appropriate users were asked to log off for a final data pickup. On Saturday, the data was reloaded at the receiving center. Several key Corporate Information Service Department programmers and end users came in Sunday to test the system for problems before Monday morning logon.

The data was loaded onto magnetic tapes and sent by air courier service from Bellaire to Tulsa, and vice versa, at different times. "It was a continuous process. As we sent up data daily and over the weekend, we sent it on three different planes with someone there to meet the planes," Anders added.

"The intent was when users came in on Monday morning, they would not even know the migration took place. Generally speaking, we were fairly successful at doing that. The key was to move the data ahead of time as much as possible," Sternfels said.

TOP OF THE NEWS

NEWS from page 1

in the current fiscal year.

■

Voting control over Eagle Computer, Inc. will be held by a South Korean firm by the end of March if provisions of a financial deal announced last week are met. Eagle said Korea Electronics & Co. will acquire voting control through a new issuance of preferred stock. The deal hinges on Bank of America's willingness to accept preferred stock in exchange for $4.4 million of long-term debt and on Eagle obtaining a cash infusion of $2 million.

■

The major tax reform bill approved last week by the U.S. House of Representatives would kill the 10% investment tax credit, which may raise slightly the cost of buying or leasing computers. The bill had modest support from the computer industry because it would allow a 20% credit for R&D expenses for three years, retain five-year depreciation for computer equipment and cut the top corporate tax rate to 36%.

■

Honeywell, Inc. will come out with its first 32-bit virtual superminicomputer by the middle of 1986, according to Eugene Manno, group vice-president of Honeywell's Small Computers and Office Systems Group.

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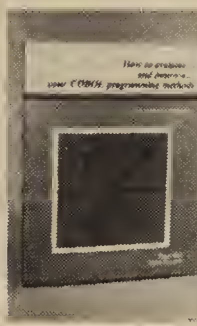

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FCC approves X.25 conversion services

By Bryan Wilkins

WASHINGTON, D.C. — New Jersey Bell was recently granted approval by the Federal Communications Commission for its X.25 protocol conversion service. The subsidiary of Bell Atlantic Corp. will market the service to computer firms and microcomputer users.

The FCC had held up its approval of the X.25 protocol conversion tariffs filed by New Jersey Bell, Bell South Corp. and Nynex Corp. while it reviewed complaints and motions to delay filed by other value-added carriers such as GTE Telenet Communications Corp.

The other carriers contested the telephone company's security controls over customer proprietary information as well as its other aspects of pricing and configuration.

Private value-added carriers depend on local telephone companies to deliver their services to end users, and the carriers say they are alarmed by the entrance of the telephone company into the packet data field. They assert that the marketing forces of telephone companies can learn about their clients' data communications needs and target them with their own sales forces.

The FCC upheld the view of the private value-added carriers and demanded the separation of accounting, billing and customer information within telephone companies for packet-switching service and voice service. The FCC accepted New Jersey Bell's plan to mark its customers' accounts and billing records with a symbol identifying the records that cannot be viewed by sales personnel marketing X.25 conversion services.

Additionally, the FCC accepted New Jersey Bell's plan to mark with a symbol customer billing records associated with long-distance carriers and information service providers, such as data base services, that may also use X.25 protocol conversion. Sales personnel at the telephone company will have to sign nondisclosure statements and affidavits pledging to abide by the rules.

New Jersey Bell said its rates for its local packet-switching service would be 4 cents for the first minute plus 1 cent for each additional minute for the basic charge as well as 40 cents per kilopacket for the usage charge. These rates would apply mostly to residential users.

Larger users would pay a charge of approximately $27 per month for basic service at 1.2K bit/sec., $48 per month at 2.4K bit/sec., $75 per month at 4.8K bit/sec. and $105 per month at 9.6K bit/sec. Usage charges will range from 40 cents per kilopacket for volumes up to 2,000 kilopackets per month to 32 cents per kilopacket for volumes of more than 6,000 kilopackets per month.

AT&T regional holding companies and their local telephone subsidiaries said that they expect demand for their public packet-switched X.25 service to develop gradually. The New Jersey Bell X.25 protocol conversion tariff approved by the FCC is slated to go into effect Dec. 23, Bell Atlantic said.

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Users attack 1-2-3 move

From page 1

to injury.

Lotus charges $150 for single-copy upgrades, $125 each for upgrades of 100 or more copies and $100 each for upgrades of 1,000 or more copies. Release 1A copies bought within the past six months are upgraded free.

"Our bulk purchase was only a little more than twice the price of the upgrade," said Karl Kendall, Metropolitan Life Insurance Co.'s New York manager of microcomputer support.

Several managers also complained that they would prefer to go through their dealers rather than directly to Lotus because dealers might offer more attractive pricing on an upgrade. But dealers "just don't want to deal with it for that kind of money," said Lotus Sales and Service Vice-President Stephen Crummey.

MMA's Gross estimated the cost of upgrading 500 copies at $625,000 and 750 man-hours — figuring $125 each for copies, a half hour to install each copy and another hour to convert files — which is accomplished by simply storing them under the new program.

Gross is currently supervising dual installation of 1-2-3 Release 1A and the new Release 2 on his company's hard disks "with very strong warnings to users to use 1A." Moreover, he added, "We're trying to avoid upgrading, at least temporarily."

A Lotus spokeswoman said that upgrade response is "above projections," but that the company knows that not all users will eventually upgrade, though it encourages them all to do so.

"It's new technology, and it's where we're going with the product," she said. "But we also wanted the new product to be very familiar. It's still good old 1-2-3."

Steven Roth, manager of decision support systems for Manufacturers Hanover Leasing Corp. in New York, said he almost wishes the new 1-2-3 was not so familiar. Lotus justified the price by saying, " 'This is like a new product,' " he noted. "If it is, let them call it 1-2-4 and let us continue to buy 1A."

Roth further charged that Lotus does not realize — or care about — the implementation problems that an upgrade can create for major customers. "It's making more work for us until everybody's on one version," he said. "The companywide stuff is going to have to be on 1A. We're going to have to go for the lowest common denominator. That's a pain because there are some nice new features in Release 2."

"The problem is, what is the alternative?" Lotus' Crummey asked. "As technology moves ahead, we have to stay with it."

Crummey emphasized that "we do not intend to abandon 1A customers at all." He also listed the special upgrade arrangements for corporate customers, including discounts and the ability to destroy old copies rather than ship them back to Lotus.

Manufacturers Hanover Leasing's two dozen Digital Equipment Corp. Rainbow users that are stuck with Release 1A are "dropped in the ocean," Roth added. Crummey replied that the company will upgrade versions for other selected systems eventually, with DEC and Wang Laboratories, Inc. micros among the most likely candidates.

> ***'Lotus has always been a little arrogant. It seems to think the personal computer was built for Lotus.'***
>
> — Karl Kendall
> Metropolitan Life Insurance Co.

McDonnell Douglas Aerospace Information Services Co. Senior Section Manager Richard Nelson said he dreads upgrading 3,000 users and crates of archived data.

Gross said the MMA wants Lotus to reconsider its upgrade policy.

"They should've left the original on the market for six to 12 months so the corporations could evaluate and ease into the new version."

He is not optimistic that his crusade will change Lotus' mind, but hopes other software companies will take note and perhaps strengthen their alternatives to 1-2-3.

Many other packages now can read 1-2-3 files, Metropolitan's Kendall commented. Metropolitan's large Supercalc user community may grow thanks to Lotus, he added. "Lotus has always been a little arrogant. It seems to think the personal computer was built for Lotus.

"Upgrades are a hard pill to swallow as it is without having to deal with mandated updates and difficult pricing policy," he added. "And it doesn't do the corporate support people any good.

Roth echoed the charge. "Lotus is taking unfair advantage of a very loyal user community," he said. "It's a pompous act. I'm disappointed. The whole thing leaves a bad taste in my mouth. Adam Osborne, where are you?"

More than a few of Roth's counterparts said they are calling Osborne's software outlet, Paperback Software, Inc., to evaluate its low-priced 1-2-3 look-alike, VP Planner.

Osborne declined to give names, but said he has demonstrated VP Planner to more than 100 corporations since its introduction in October and has entered site licensing and volume purchase negotiations with several businesses. VP Planner actually goes beyond 1-2-3, combining a spreadsheet and data base manager and is priced at $99.95.

Osborne promised upgrades will "read 1-2-3 Release 2 files, but write Release 1A files. . . . We feel 1A will remain the industry standard."

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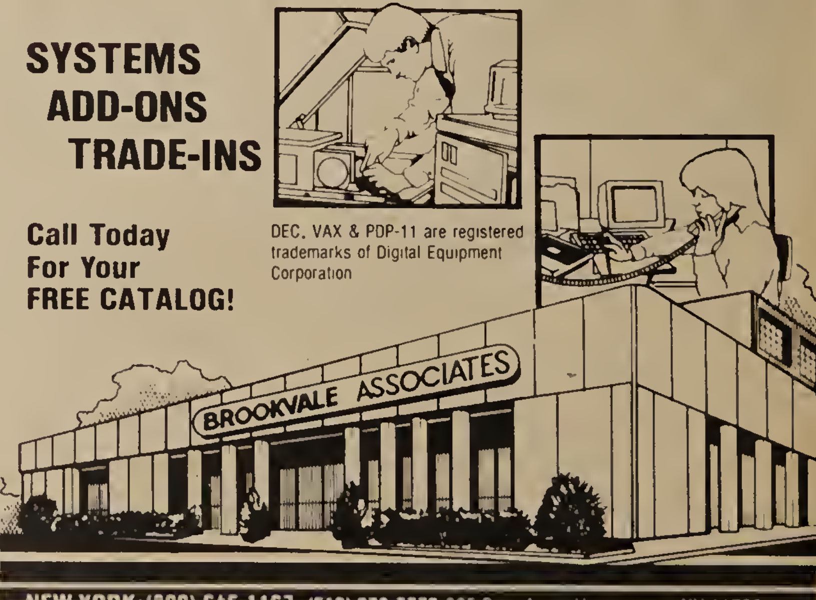

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VIEWPOINT

EDITORIAL

The best and worst of times

The temptation all along has been to label 1986 as a disaster, perhaps the worst single year, economically, in the history of the U.S. electronics industry.

The semiconductor slump turned into an everything slump. Thousands of employees at such bastions of fiscal stability as Wang Laboratories, Inc., Honeywell, Inc. and AT&T were laid off. Financial reversals in the micro market hit hard at such one-time highfliers as Lotus Development Corp., where growth slowed dramatically, and Apple Computer, Inc., where founder Steve Jobs was judged out of step with a maturing market and was kicked first upstairs and then out the door.

But preoccupation with vendors' balance sheets is both risky and wrongheaded. Such an attitude tends to ignore the continuing vitality and energy present beneath the surface of an industry that continues to experiment, develop and otherwise explore the far frontiers of electronic technology. Indeed, the past year was rife with major developments that will have direct impact on the professional lives of those in the DP community.

Most major mainframe and supermini manufacturers either introduced or began delivering their next-generation machines — for example, the IBM 3090 Model 200 and the Digital Equipment Corp. VAX 8600.

The International Standards Organization's Open System Interconnect (OSI). network architecture model took a giant step forward when IBM opened an OSI research facility in France and announced OSI support up through the middle layers.

IBM's Token-Ring network debuted and thus ratified the local-area network market.

Intel Corp.'s 386 chip was finally introduced, providing the engine for a new generation of small footprint computing devices.

DEC's Microvax II set new industry standards in the race to put more power on a chip.

Palladian Software, Inc. and Applied Expert Systems, Inc. delivered where others had only promised, unveiling the first commercial expert systems for business applications.

The murky outlines of IBM's integration strategy became clearer thanks to developments in LU6.2 and the Distributed Office Support System (Disoss). Vendors such as DEC and Data General Corp. announced Disoss compatibility.

New code restructuring products and services permitted users to unscramble spaghetti code.

After nearly a decade of debate, Cobol 85 was finally approved, making that venerable language a far better tool, particularly for large DP shops.

General Motors Corp.'s Manufacturing Automation Protocol gained vendor and user support, and Boeing Computer Services Co. introduced a similar user-driven office standard, the Technical Office Protocol.

Although the above list is not all things to all DP professionals, it indicates that even during an industrywide decline, the computing world moves staunchly ahead. Corporate America has far too much invested in information technology to stop and wait while overly optimistic — and perhaps misdirected — vendors sort through their bottom-line woes. If 1985 proved anything, it proved that technology is user driven. This lesson may serve everyone well as the second half of the decade begins. Happy New Year.

LETTERS TO THE EDITOR

DPMA exec defends group's efforts to influence DP-related legislation

During the past two years, the Data Processing Management Association (DPMA) has made computer crime one of its main focal points in government affairs. However, the editorial "Security alert" [CW, Nov. 25] contends that the DPMA has been neglecting its responsibilities to the data processing field by not participating in the interstate debate on computer crime that has developed in the U.S. Congress.

No organization's activities and successes receive total coverage in the press. Your readers need to know that the DPMA has played and is playing a significant and influential role in shaping national policy and thought.

As the largest association representing the information management profession worldwide with nearly 50,000 members, the DPMA is highly concerned with public policy issues affecting the industry. When an issue arises, the DPMA first develops and adopts a formal position statement that represents the opinions of DPMA members. After such a position statement is adopted, an organized effort is made to let that position be known in Congress and in state legislatures.

Such will be the case in 1986 as DPMA members introduce the DPMA's position on VDT legislation to lawmakers in all 50 state capitals and in Congress. Additionally, the DPMA has proven to be a valuable resource to lawmakers in terms of its expertise and large representation of the data processing profession.

The same holds true for DPMA's activity on computer crime. DPMA members have participated in congressional hearings in the past, and efforts last year were geared toward the drafting of the model act, which is applicable at the state and federal levels. DPMA's Model Computer Crime Act addresses the need for comprehensive laws in all 50 states as well as the problem of interstate crimes. When officially adopted by the DPMA in 1986, the model act will be introduced to state legislatures and Congress.

A number of key legislators have already expressed an interest in DPMA's Model Computer Crime Act. Individuals with experience in computer crime legislation around the country are being requested to review the second draft of DPMA's document; changes for the final draft will be based on input from that review process. The DPMA will continue its efforts in representing our membership in a wide range of concerns affecting the profession, business and society.

Eddie M. Ashmore
International President
DPMA
Park Ridge, Ill.

Prototyping still key to productivity despite fourth-generation claims

The article "Language barrier: The fourth generation at work" [CW, Nov. 11] highlights a widely held misconception in our industry: that fourth-generation languages are the key to productivity.

Prototyping is the real key to productivity because it is the only way to ensure that the system being developed will meet the user's needs. Having to retrofit a system after failing acceptance testing costs more than a fourth-generation language could ever save.

With prototyping, you correct the requirements analysis early in the design phase by allowing the user to see exactly what the final system will look like. Because most users do not have data processing expertise, you can hardly expect them to understand what the system will look like until they see it and work with it.

Just ask James Martin. He will tell you that you are better off with a good prototyping tool than a fourth-generation language even if you had to write the whole system in Cobol based on the specifications from the prototype.

All of this controversy about the inefficiencies of fourth-generation languages reminds me of a consultant I know who was asked to help out a 30-member project team at one of the Big Three automakers. They had designed a system to configure cars based on the historical demand for different options. Unfortunately, their system produced cars with three backseats and six tires. After a month of work, he came up with a design for a system that really worked, only to be challenged by the 30 people who stated that their system was more efficient.

If we cannot get the specifications right, who cares about efficiency?

Jon Pearkins
Technical Support Officer
Synerlogic, Inc.
Ardrossan, Alberta

VIEWPOINT

Matching personalities to jobs

By Walter F. Cuirle

Overheard at the next table during a dinner meeting was the following conversation:

"It's ridiculous. I might as well quit trying to do long-term projects and open up a school for programmers. Turnover is running something like 20% lately; it seems that no sooner do I get new hires up and in harness than they're gone."

"So how does your boss feel about it?"

"He understands. He's concerned, but he understands. We're going to try to play with the salary structure, and we just got the money approved for that. We think it will help."

"You're lucky. Charley over there is afraid he'll wind up on the street because his 12% turnover is significantly above the company average. Say, if you're looking for . . ."

It's almost an article of faith that low employee turnover is better than high employee turnover. The problem lies in finding a realistic figure for acceptable turnover. If a company is in high-tech goods or services, it probably has similar employee problems. Management in such a company is likely to be understanding and will probably be willing to work with the MIS director and other department heads to correct the problem.

It is likely to be a different story in a company where MIS is just part of the internal support services. There, the role of MIS is important but secondary. If employee turnover is out of line with the rest of the organization, then it's predictable that in some cases upper management will blame the MIS supervisor. After all, if other departments can keep their people, why can't MIS?

MANAGEMENT MATRIX

It seems that the support and attention you get for this problem is proportional to the weight that MIS has in the organization. The corollary to this is that there just doesn't seem to be any one percentage that everybody will agree is normal for employee turnover. Whatever it is, most managers would like to see it lower.

One place to start is at the interview. Let's set salary considerations aside for the moment and look at the people. Most managers ask about the prospective employee's goals and experience. What about talents? Do you know what your potential employee likes to do and is good at doing? Careful, now — these talents may or may not match the experience shown on the resume. Once you know the kind of work someone likes to do, you can tailor assignments to match. It can be a powerful motivator.

It's hard to match talents in the context of traditional staff titles. After all, it doesn't mean much to say that someone likes to do senior systems analysis. Staff titles are a convenient shorthand for comparing experience, responsibilities and salaries from company to company. It doesn't tell you much about whether or not the person was any good at the job, let alone whether or not he actually liked the work.

Look at the job of creating software and systems from a different, broader point of view. If software is a tool, then at least three different types of people are involved in its production: tool users, tool designers and tool makers.

The tool user has a talent for seeing how a system should look from the point of view of the end user — your client. The value of this talent is most visible in the problems that develop when you don't have a good tool user on staff.

You've been here before — your staff does its homework, develops a good set of specs and gets the end user to sign them off. You put the new system in place, and then the complaints start: "This field ought to be in the upper right corner of the screen"; "We don't use that abbreviation, we use this one"; "Why did you put the menu in that order?"

It's no wonder you hear MIS people complain that end users don't know what they want. A tool user knows what the system can do and enjoys figuring out how your end users do their work and what the best way is for a system to support it. This is a talent for optimizing the user interface.

A tool designer gets the most enjoyment from painting a system in broad strokes. At this level, that carefully crafted user interface is just so much I/O. It isn't so much that the interface isn't important to the designer, it's just that there are far more interesting things like choosing the best file type and structure and language for the job. The designer's interest wanes when it is time to start coding. Code they can, if code they must, but your designers would rather leave that last step to someone else.

That someone is the tool maker. Here's a person who would rather code than do anything else and takes pride in attention to details that no one else is ever likely to see. When a project is going full tilt, the typical tool maker stereotype is the programmer in the corner who you have to kick out at the end of the day, the one who says, "Wait, I just want to try one more thing."

You can see these three different personality types in other endeavors. Building a house, for example: interior designers and landscape people share the personality of tool users; architects and structural engineers are like the tool designers; bricklayers, carpenters and paperhangers are similar to the tool makers.

The whole idea is a simple one: people will stay with work they like to do. If this is so, it might be worth your while to match up the available work with people who really like to do it rather than just people who can do it. It's worth a try. Who knows? You might even find somebody who likes to do maintenance.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

Making the case for free trade

By Scotty McArthur

The strongest arguments in the heated debate over U.S. trade policy concern, natually, what decisions would be best for the American consumer. Protectionists in the U.S. Congress urge import quotas and tariffs to guarantee jobs. President Reagan, however, insists that such trade barriers would raise prices but would not forestall the adjustments needed by our older industries.

The billion-dollar annual cost of protecting the textile industry and the hundreds of dollars added to U.S. car prices by limiting Japanese imports are well known. What has not been addressed by either side is the impact of protectionism on the millions of consumers who use computers and high-tech components daily.

Journalists chronicle the computerization of America — the revolution is mass markets, corporations and government bureaucracies caused by technological changes in everything from welfare to airline tickets. Economists, in turn, explain that the cost of computing power has declined annually at 13% for 15 years, pushing up industrial productivity.

More difficult to examine, however, is the vast contribution that microelectronics has made in savings to small businesses and to the home.

There are now 8.8 million personal computers in the country that are used for routine tasks such as store inventories, education programs, farm management and tax returns. Moreover, nearly all of our household appliances such as washing machines, toasters and ovens use high-tech components that were unimaginable only a decade ago. It is on this personal level that the remodeling of the U.S. culture and its lifestyle is really occurring.

READER'S PLATFORM

”

The protectionist measures proposed in Congress would increase computer prices and impede consumer access to the newest technology.

Yet the protectionist measures proposed in Congress would both increase computer prices significantly and impede consumer access to the newest technology. Such severe consequences would result from restrictions placed on the essential "foreign-sourcing" of the parts and components that go into U.S. computer products.

U.S. high technology is the most competitive in the world. This is due in large part to the globalization of the U.S. computer industry, meaning that parts are bought or manufactured by U.S. subsidiaries in foreign countries such as Singapore, Hong Kong, Ireland and Japan.

The result has been products of the highest quality and the lowest prices from an industry that has increased its own employment annually at 10% since 1978 while helping to create six million new jobs in the U.S. since 1981.

A computer price hike would be only one effect of new tariffs and quotas. It would be followed inevitably by foreign retaliation against U.S. exports, a blow to U.S. high-tech companies that derive half of their revenues from foreign sales.

Moreover, the price changes would steadily undermine U.S. leadership in research and development because immense R&D costs can only be met if the industry remains competitive in the global marketplace.

Conceivably, large U.S. companies could eventually absorb the new costs of computers and afford to depend on high-priced foreign technology. The impact on consumers and on small businesses, however, would be dramatic.

Higher prices and less accessible technology would strike that part of our economic growth that has depended extensively on the energy of individual Americans.

In fact, the protectionists in Congress would essentially be imposing a new tax on American consumers. And the effects of this tax would be so complex that everyone would need powerful personal computers to calculate the additional costs.

The solution to the trade imbalance and to unemployment in specific industries lies in increasing overall U.S. productivity and exports, not in the complacent protection of the products that such productivity has given us since the introduction of open trade in 1945.

Abuses of that system by our competitors cannot, of course, be excused. However, the protectionist cure would not only be counterproductive to our economic future but would also be unfair to individual Americans along the way.

McArthur is chairman of the Computer and Business Equipment Manufacturers Association, headquartered in Washington, D.C.

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SOFTWARE & SERVICES

SOFTALK
John Gallant
CW Senior Editor

Lessons from a lean year

The year 1985 is one software vendors should reflect on, if only because it's a year they would probably like to forget.

Lest all perspective be forgotten, the software industry enjoyed some growth in 1985. But the fall from the dizzying peaks of earlier years was swift, and vendors ought to take some time to consider the forces behind the sudden shift in their fates.

Much of the blame for the doldrums — a mild term that will be replaced by something much harsher should the industry not rebound strongly in 1986 — has been laid on the economy, which led to slowed capital expenditures. But many insiders attributed the slowdown to more persistent and fundamental problems troubling the user community.

No problem is more fundamental than productivity. Thomas Nies, chief executive officer of Cincom Systems, Inc., expounded on this theme during several speaking engagements throughout the year. Nies was notable among the growing community of users and vendors that has recognized the impact that stalled software development productivity growth has had on the industry and on U.S. business.

If software vendors cannot address their productivity problems and provide the tools with which users can substantially boost their productivity, growth in both the hardware and software sectors may falter for years to come. When it comes to productivity,

See **LESSONS** page 16

Software running for office

Company markets governor's homemade package

By Rosemary Hamilton

LEXINGTON, Mass. — What began as a homemade software package in the executive office of the governor of Massachusetts is quickly becoming a hot item for a tiny Lexington company. While the software, known as the Governor's Executive Information System, has undergone a number of refinements since its commercial debut in mid-1985, users are bullish on it and said it greatly improves information management in their offices.

Earlier this year, the consulting firm Technology Systems, Inc. won the marketing rights to the software package. Arch O'Reilly, systems analyst in Governor Michael Dukakis' office, developed it for the office's Wang Laboratories, Inc. VS 100 minicomputer. It was designed to automate the gubernatorial office's major tasks — correspondence, scheduling and the tracking of requests, constituents, job applicants and appointees. The total package sells for $45,000, but the five modules can also be purchased separately.

O'Reilly wanted a tool to manage information better and bring an end to the massive flow of paper in Massachusetts' executive office. "I frankly have yet to see a front-office package that I would consider using," he said. "Given the chance, I said I could do better."

He set out to design his own system but needed help writing the code. On the suggestion of Wang, O'Reilly contacted Technology Systems. Realizing the potential of the package, Technology Systems struck a deal with O'Reilly and the commonwealth of Massachusetts, which will get royalty fees on each package sold. O'Reilly estimated that Massachusetts could make up to $300,000 by the end of next year.

To date, the governor's office in the state of Washington has purchased the entire package, and the executive office of the state of Illinois is considering purchasing the system. MIS directors from both offices said they were impressed with the software although each said it would have to be tailored to meet their specific needs.

John Boyd, MIS director in Washington Governor Booth Gardner's office, said the Governor's Executive Information System should be a major improvement there because when he began working at the office it had been operating "not much differently from the territorial days."

> ***'There's a tremendous change in how much more organized we are.'***
>
> — John Boyd
> Washington Governor
> Booth Gardner's office

Boyd's office purchased all five modules, but only the scheduling and calendar module is up and running. Yet, Boyd said, "There's a tremendous change already in how much more organized we are."

He also said a number of modifications had to be made because the original Massachusetts version is geared toward a larger, more departmentalized organization. As a result, the modules function as standalones. Boyd requested such functions as a global search across all five modules and interfacing between the scheduling requests and calendar so that information can be quickly merged from the request files to the governor's schedule.

Similarly, Governor James Thompson's office in Illinois is optimistic about the package although it has yet to sign a contract. "It is our intention to purchase it. We were really impressed," said Randell von Liski, director of MIS. "There are some functions, like scheduling and constituency tracking, that are unique to a governor's office, and they seem to have it down really well."

The gubernatorial market is a limited

See **SOFTWARE** page 16

INSIDE

TSI International introduces the PC Option to its Key/Master data entry system/**16**

NEW THIS WEEK

- Software Solutions ships Dataease 2.5
- For more on this and other new products, see pp. 37-40.

INSTANT ANALYSIS

"Sex and software maintenance have two major differences. In the sex business you may get rich. In maintenance, you may hardly make a living. If you have tried maintenance, you know the second difference: Sex is exciting, while maintenance is avoided and even hated."

— Girish Parikh, from his book *There is a Fortune to be Made in Software Maintenance*

Symbolics 3600 family gets Ada programming package

By Paul Korzeniowski

CAMBRIDGE, Mass. — Symbolics, Inc. has announced an Ada programming environment for its 3600 family of symbolic processing systems.

The Symbolic Ada Programming Environment includes an Ada compiler and Ada software development tool kit. The package meets the Minimal Ada Program Support Environment, a rating that falls in the middle of the U.S. Department of Defense's three-step scale of an Ada programming environment's capabilties.

The environment includes an intelligent editor, a window-oriented debugger, support for creation of on-line documentation, a user interface tool kit and program metering tools.

Joseph Morin, Symbolic's Federal Systems Group manager, claimed that a chief benefit of Symbolic's Ada offering is its integration with other Symbolic packages. The Symbolic Ada Programming Environment can call and execute programs written in Symbolic Fortran, Pascal, Prolog and LISP programming languages.

The company plans to enhance the package's editor so that portions of an Ada program can be modified without having to run an entire program. Morin estimated that this capability would be added during the summer.

The environment costs $12,500.

Expert capacity planning tool bows

By James Connolly

NEW YORK — A consulting firm that specializes in capacity management, International Systems Services (ISS) Corp., has announced its first software package, which includes a microcomputer-based expert system for managing IBM mainframe system growth.

ISS Three reportedly was designed for use by experienced capacity planners and others who need to analyze current and future computer capacity requirements. The package consists of two components, a mainframe tool known as MVS Analyzer and a microcomputer program known as Capacity Planner. Designed to work together, the two components are available individually.

MVS Analyzer reportedly extracts, summarizes and reports on system activity for IBM MVS/SP and MVS/XA operating systems and provides automatic input to the Capacity Planner through Digital Communications Associates, Inc. Irma and Irma-compatible micro-mainframe links. MVS Analyzer is said to interface with other mainframe performance measurement systems and to provide automatic analysis of IBM's SMF, RMF, CMF and IMS log data.

Capacity Planner is an expert system using several hundred rules based on the experiences of ISS consultants regarding the capabilities of various IBM and IBM-compatible medium- to large-scale systems.

A company spokesman said that in a typical application, a planner would insert variables such as projected changes in a user department's transactions. Capacity Planner would then analyze those figures and the company's current configuration and would recommend upgrades or new configurations for CPUs, I/O and memory. The system is said to provide several "what-if" opportunities, including least-cost and least-change options.

The mainframe module costs $10,500, while the micro package for IBM Personal Computers and compatibles with a minimum of 512K bytes of memory costs $18,000. Optional modules for interfaces, with measurement products such as Morino Associates, Inc. MICS, cost from $2,000 to $3,500.

Software runs for office

From page 15

source of revenue for Technology Systems, since it can only produce a maximum of 50 clients. And not all the governor's offices seem interested. John Martin, systems manager at Governor Robert Kerrey's office in Nebraska, said the Technology Systems software would "duplicate the system we've developed ourselves." The office has been writing software for a Wang VS 45 that was installed in November.

The state of New York, which has networked IBM Personal Computers in Governor Mario Cuomo's office, is not interested. A move to that package would require an entirely new system, something that is not in the budget. The software "sounded good, but we're not looking for a system right now," said George Kash, chief of data processing services.

Realizing the limits, Technology Systems is also making a pitch to mayoral offices nationwide. As of last week, the company had two mayoral customers: the cities of Lowell, Mass., and San Jose, Calif.

Sue Roux, a secretary in the city manager's office of Lowell, sums up the office's experience with the software as "great." Prior to the system's installation in September, Roux's department kept track of city board and commission appointments manually. Now, Roux can call up a commission's file, and the system will display members as well as the dates when seats will be vacated.

Lessons from a lean year

From page 15

every vendor — from IBM to the smallest manufacturer — has far to go.

In a recent letter to this author, John Maguire, chairman of Software AG, blamed "data base management system and fourth-generation language performance problems that were recently uncovered" as factors in the slowdown. Maguire's point is well taken.

The debate over the capabilities and applications of relational DBMS and fourth-generation languages continues — and continues to confound users. Recent *Computerworld* articles on the technologies prompted vigorous responses from proponents and opponents. That users have shied from embracing these emerging technologies is hardly surprising.

It is time for vendors to spell out clearly the current and planned-for capabilities of these products and to come to grips with the fact that misguided marketing campaigns that trumpet the latest buzzwords often backfire. If the air can be cleared, users will feel less uncomfortable with the technologies and may see their way to purchasing these as-yet-incomplete, but evolving, products.

Scott Smith, vice-president of the Gartner Group, Inc., recently highlighted another nagging problem that has caused users to hold off on software purchases. Smith cited problems in the installation and delivery of announced products from major vendors. When users hear of such problems, they become leery of investing in major, functionally complex systems. Users need tested, tried solutions, and any perceived gain a vendor wins by preannouncing a product will be offset by user problems and negative publicity.

As the new year approaches, software vendors would do well to start getting their houses in order. It may be easier now for vendors to blame the economy for their woes, but it may prove painful in the future.

TSI data option uses IBM micro

By John Gallant

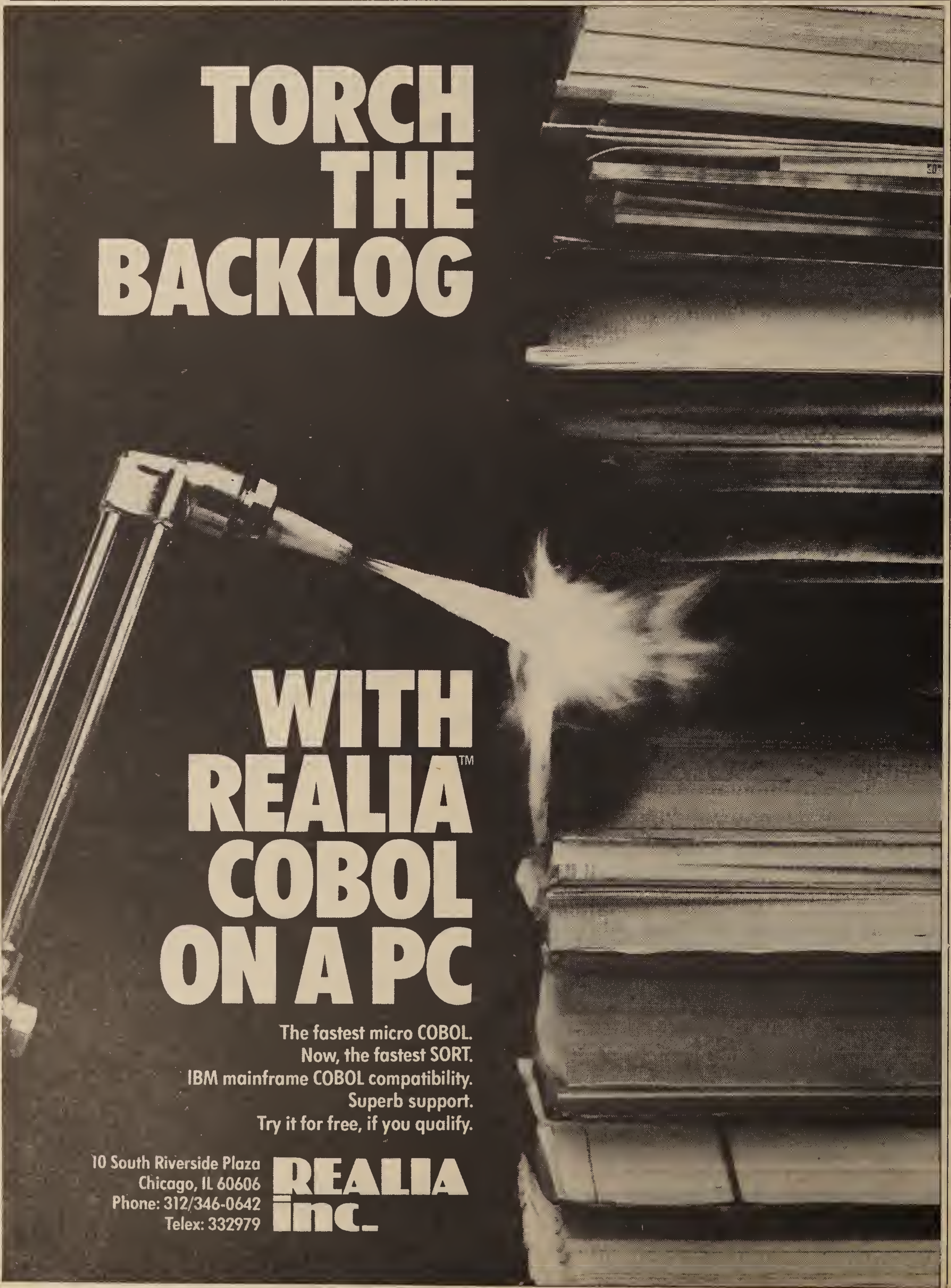
NORWALK, Conn. — TSI International has unveiled an option to its mainframe Key/Master data entry system that supports the use of an IBM Personal Computer as a data entry station.

According to James Russo, director of marketing for TSI, users can build a data entry application with the Paint-The-Screen portion of Key/Master and download it to the micro with the new PC Option. The application is automatically reformatted for the micro and can be used to capture data that is then uploaded in a format useful to the mainframe application.

Russo said the downloaded application can be cross-loaded to other Personal Computers, either physically through a diskette transfer or via a local-area network. Most verification and editing of data can be performed at the micro level, and further data checking can be performed on uploaded data at the mainframe. The downloaded application handles all security.

The micro, Russo claimed, frees data entry personnel from the constraints of mainframe system availability and response time, and it can relieve the mainframe of most editing and verification tasks.

The PC Option is compatible with all Key/Master systems. It runs on an IBM Personal Computer, Personal Computer XT or AT. One micro data entry station must be equipped with a Digital Communications Associates, Inc. Irma communications board for mainframe communications. The PC Option costs between $12,000 and $15,000. Key/Master costs between $18,000 and $30,000.



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3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant.
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  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems

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  - Manufacturer: ________
  - Model: ________

3317-01N5

MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Schemes fail to stop copies

While the technical problems in software protection remain unsolved, the need may be dropping — at least in corporations.

On the technical side, clever people keep coming up with schemes that quickly crash and burn.

Two years ago Whitesmiths, Ltd. proposed supplying each package with a hard-to-duplicate decal that could be affixed to the authorized machine. This concept vanished without much interest from other vendors.

Mother Jones's Son's Software went a step further. "Violate this agreement and our attorneys will see to it that life on earth, as you know it, is completely ruined," the license warned. "You agree that, 30 days after you violate this agreement, ownership of your eternal soul automatically passes to us."

Among suppliers of more conventional copy-protection technology, no one has gotten tremendously rich. Vault Corp., one of the two best known suppliers, recently entered Chapter 11 bankruptcy.

It's old news that today's anticopying setups collapse under pirate attack but can thoroughly annoy legitimate users. Responding to user complaints, Micropro International Corp. and many smaller vendors have dropped copy protection during the past year.

As in a host of other cases, this topic divides manufacturers into two groups, with the big guys bucking the trend against copy protection.

A year ago, the heads of Lotus Devel-

See **SCHEMES** page 20

Micro-DEC 'pipeline' out

Software aids in writing distributed applications

By Eric Bender

NEW YORK — Software that sets up a "generic pipeline" between personal computers and large Digital Equipment Corp. systems was introduced recently by Datability Software Systems, Inc.

Datability's Remote Access Facility (RAF) is intended for use by application designers writing distributed programs who typically find that most of their efforts go not into writing large system or micro code but into establishing a link between the two systems, Datability President Ronald Howard said.

RAF gives IBM and DEC micro users a number of capabilities on a remote computer, including automatic contact and login, direct access to files, subroutine calls and remote execution of programs.

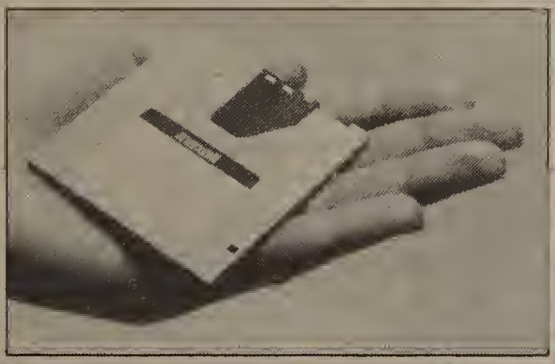
The software also lets the micro access several remote computers in a network, Howard said. Additionally, RAF offers a DEC VT100 emulation mode, with the ability to switch, with one keystroke and without losing context, between VT100 and personal computing operations.

When logged into the host, the personal computer user can access files just as if they were stored locally, Howard said. RAF also intercepts references to remote files and processes them in the same way that Microsoft Corp. MS-DOS processes local files, allowing users to employ standard MS-DOS commands such as TYPE.

"Because RAF is so completely integrated into MS-DOS, users do not have to learn special programs on their PCs or the remote computer," Howard claimed.

Application programmers can write micro programs that call subroutines on the

See **MICRO** page 20



Ultramicro floppy

Maxell Corporation of America has unwrapped an ultramicro floppy that measures 2½ in. — less than half the length of a conventional minifloppy disk. First demonstrated at the Comdex/Fall '85 trade show last month, the 500K-byte disk was designed for what Maxell said it hopes is a new era of "extremely small and compact" personal computers.

Irma makes for the fast lane

By Rosemary Hamilton

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) is shipping a version of Irma, its micro-mainframe board, that is said to be up to 100 times faster than the original product.

The $1,195 board includes two of DCA's personal computer file-transfer programs, Irmalink FT/TSO and FT/CMS. With the additional software, data can be transferred at a rate of up to 40,000 char./min.

In addition to the personal computer software, the new package includes a free copy of the associated host software. Users who purchased Irma between Aug. 1 and Nov. 15 can receive a free upgrade to FT/TSO and FT/CMS.

The new version costs the same as the

See **IRMA** page 20

INSIDE

Multimate International introduces a training program for users of its software/**20**

NEW THIS WEEK

- Epson introduces its IBM Personal Computer-compatible desktop line
- Apple upgrades Appleworks
- For more on these and other new products, see pp. 37-40.

INSTANT ANALYSIS

"A lot of add-in packages have been developed with the first-time user in mind, but the person who really recognizes their potential is the accomplished user."

— Pete Higgins, Microsoft's group product manager for planning products

Micro users get programming answers through phone service

By James A. Martin

ATLANTA — Micro Support Resource Corp. announced a telephone service that answers users' questions concerning microcomputer software programs.

Users of the IBM Personal Computer and compatibles with a Micro Support Resource service contract can call toll free to ask procedural and operational questions regarding such micro software programs as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase III and Framework, Micropro International Corp.'s Wordstar 2000 and Samna Corp.'s Samna+ and Samna Word III.

A support representative enters the caller's questions and a description of the problem into an IBM System/36. Micro Support Resource's system, called Magic Answer Extractor (MAX), then prompts the representative with further questions for the customer. When the questions are answered, MAX suggests a solution. If none is available, the problem is forwarded to a Micro Support Resource analyst. Once resolved, the problem and its solution are stored in the System/36 memory.

MAX can handle about 80% of all questions, with the rest researched and answered by in-house staff, said Micro Support Resource President Deborah Fain. "Our system eliminates the need to talk to a machine but also eliminates the need for us, or for our customers, to maintain a support staff that is expert in every software package," Fain said.

The annual cost of a Micro Support Resource contract is based on the number of packages in use. A single-user contract for Lotus' 1-2-3, for example, costs $104.

Chorus unveils image data base management packages

By Rosemary Hamilton

MERRIMACK, N.H. — Chorus Data Systems, Inc. announced two new versions of its image data base management system for IBM Personal Computers.

The Photobase Signature System, introduced last year, was designed to match signatures for such tasks as check clearing and the upkeep of personnel records. It is sold as a $4,795 add-on package or as a $15,495 workstation, which also includes an IBM Personal Computer AT with a 40M-byte hard disk, tape backup and a monochrome monitor.

Each stored signature requires about 3K bytes of memory. Approximately 9,000 signatures can be stored on a 10M-byte hard disk.

In early 1986, Chorus plans to roll out an optical disk version and one that uses color photos, although specific pricing has not been released yet, according to President Roy Clites. Outfitted with a 100M-byte optical disk drive, the system should sell for about $5,000 more than the basic configuration. The color package is expected to cost at least $1,000 more than the original Photobase.

Photobase is made up of a $500 black-and-white camera, two add-on boards and software. Once a photo is taken of a person's signature, it is converted to digital form. The data can be merged with one of three data base management software programs — Dbase III by Ashton-Tate, R:Base 5000 by Microrim, Inc. or the IBM Filing Assistant.

Chorus has found other customers looking for systems that would store other kinds of data requiring more storage space and color graphics.

See **CHORUS** page 20

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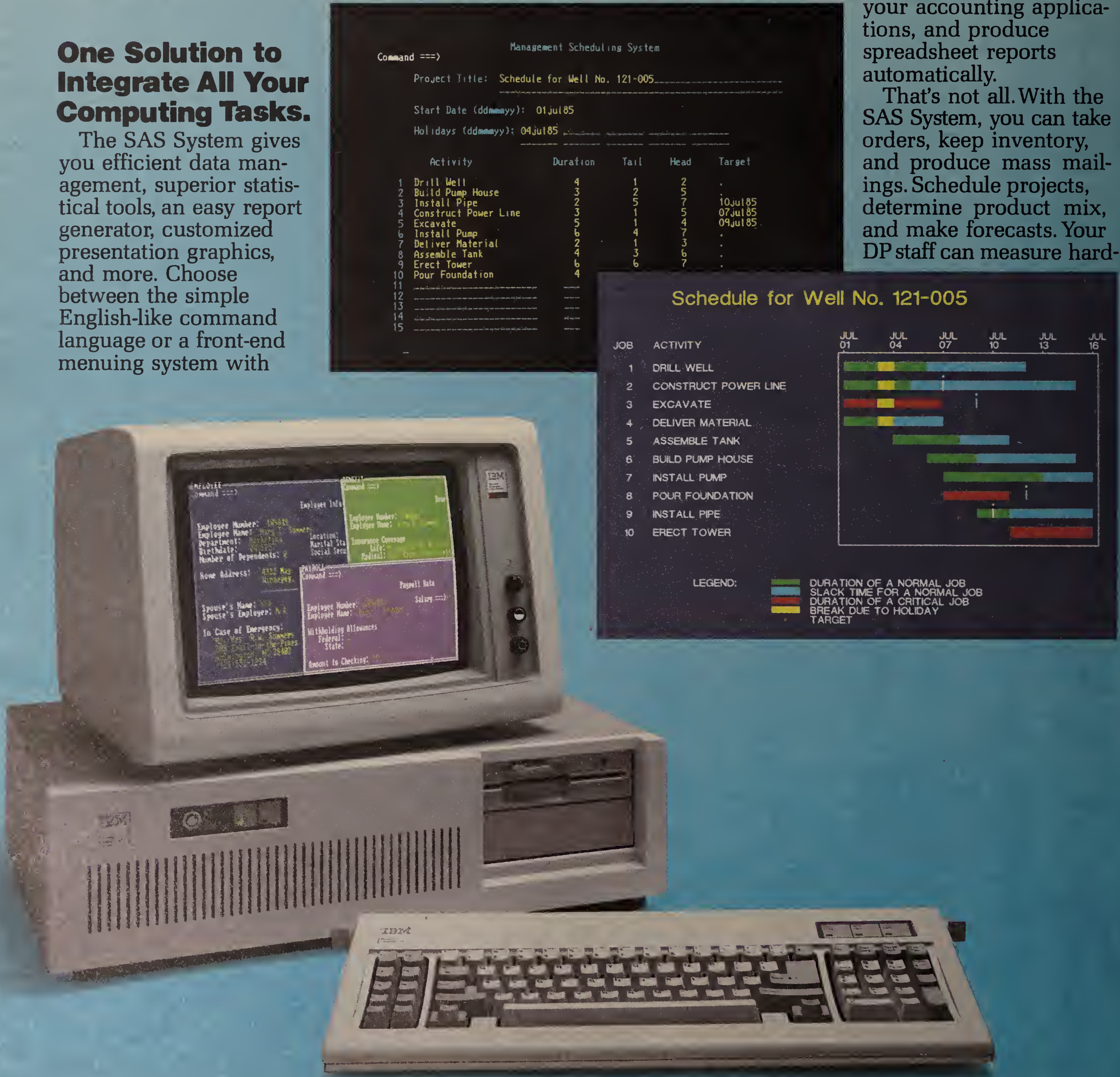

```
                         Management Scheduling System
Command ===>

     Project Title:  Schedule for Well No. 121-005______________________

     Start Date (ddmmmyy):  01jul85

     Holidays (ddmmmyy): 04jul85 ________________________________

        Activity                   Duration    Tail     Head     Target

   1  Drill Well                      4          1        2        .
   2  Build Pump House                3          2        5        .
   3  Install Pipe                    2          5        7      10jul85
   4  Construct Power Line            3          1        5      07jul85
   5  Excavate                        5          1        4      09jul85
   6  Install Pump                    6          4        7        .
   7  Deliver Material                2          1        3        .
   8  Assemble Tank                   4          3        6        .
   9  Erect Tower                     6          6        7        .
  10  Pour Foundation                 4
  11  ______________________________ ___
  12  ______________________________ ___
  13  ______________________________ ___
  14  ______________________________ ___
  15  ______________________________ ___
```

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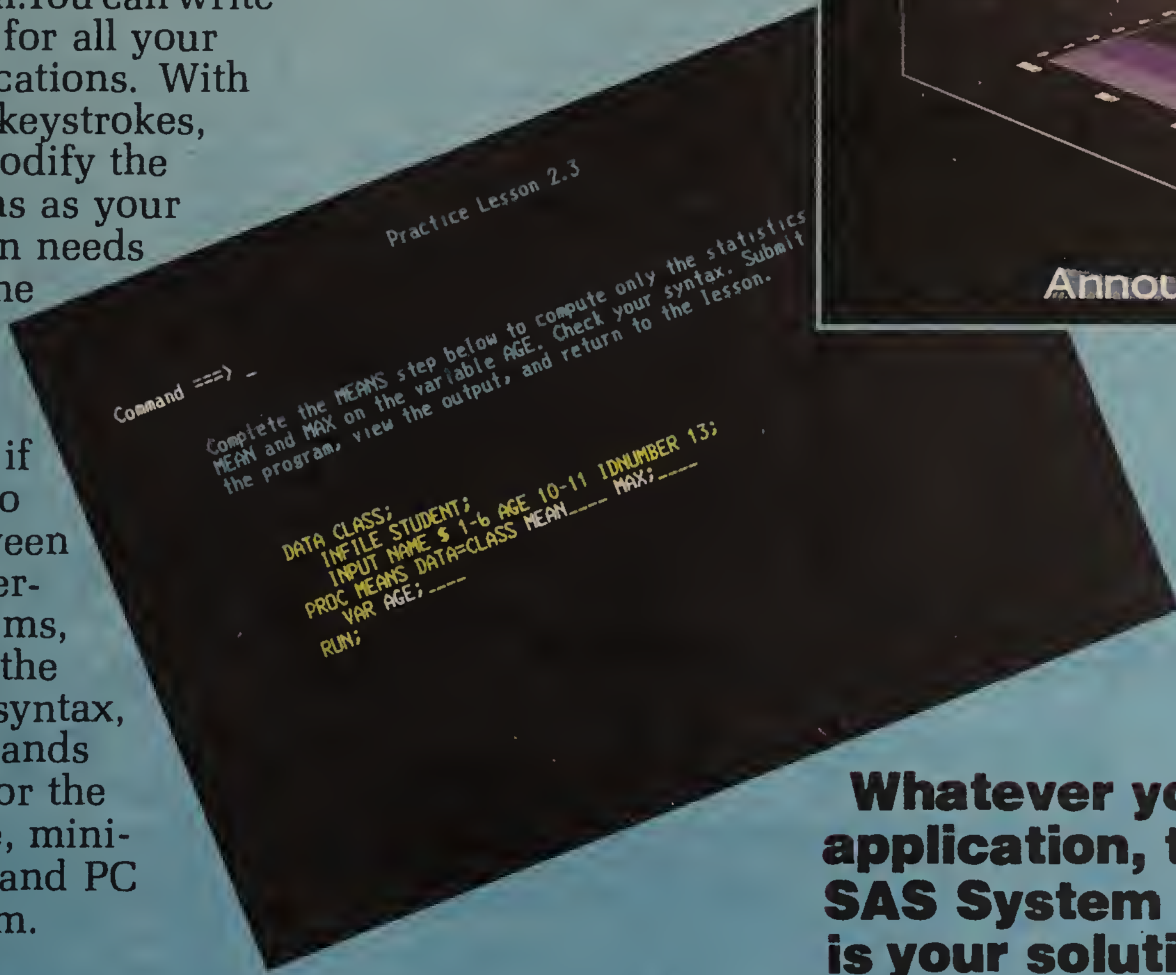

```
Practice Lesson 2.3

Command ===> _

Complete the MEANS step below to compute only the statistics
MEAN and MAX on the variable AGE. Check your syntax. Submit
the program, view the output, and return to the lesson.


DATA CLASS;
   INFILE STUDENT;
   INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
PROC MEANS DATA=CLASS MEAN____ MAX;____
   VAR AGE;____
RUN;
```

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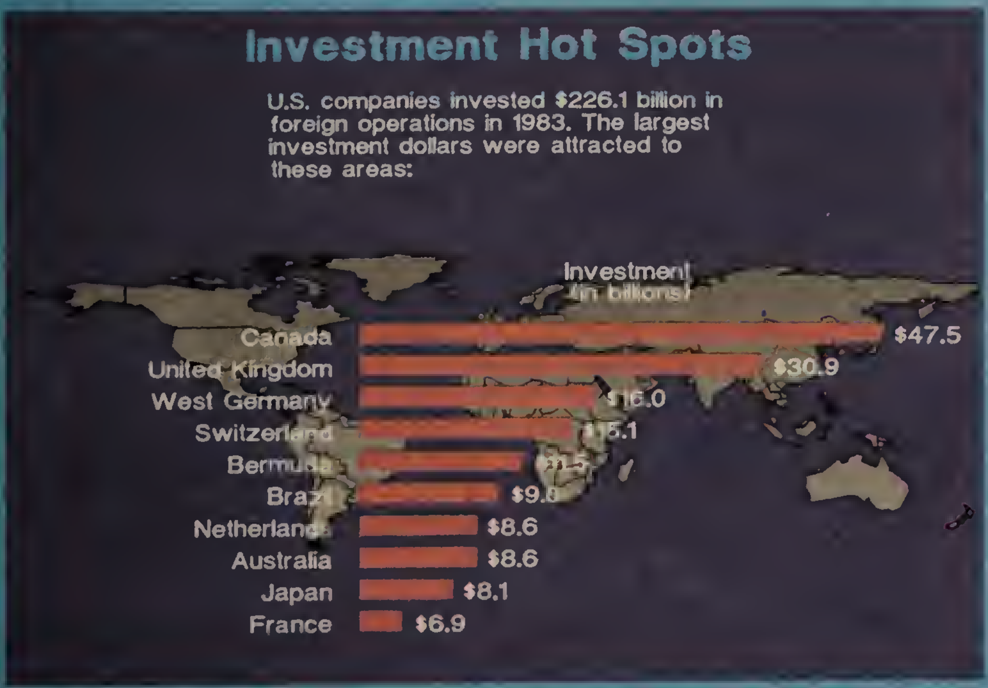

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Multimate training aid out

EAST HARTFORD, Conn. — Multimate International Corp. introduced a three-part training program for users of its Multimate word processing software. Multimate also announced that it will expand its authorized training center program.

The courseware was developed in response to requests from both corporate users and Multimate authorized training centers, a spokesman said. Developed in conjunction with the Center for Professional Computer Education, the program provides materials to train both new and experienced users.

The program consists of three skill-level packages: basic, intermediate and advanced. It is broken down into 19 lessons for presentation in three six- to eight-hour courses. The basic course takes the student from an introduction to word processing up through advanced input and editing. The intermediate course covers such functions as advanced printing, spell checking, menu bypass and IBM PC-DOS commands. The advanced course includes line and box drawing, column manipulation, key procedures and Multimate's On-File Information Manager.

Each course costs $595, but the first two levels can be purchased together for $995; all three cost $1,395. Multimate also sells a set of 35mm slides for $395 and two-color overhead transparencies for $595 that can be used as classroom aids. A 96-page demonstration kit is available for $10, and a booklet of sample courseware pages is free.

Chorus unveils image managers

From page 17

Clites said the company has attracted real estate customers, who store photos of properties, and manufacturing clients, who store photos of components or tools. In both cases, an average photo needs 10K bytes of memory, Clites said. The color, he said, is for "anyone who wants pizzazz."

Irma makes for the fast lane

From page 17

original Irma board because "we realized that users really needed to transfer at a much faster rate," a company spokeswoman said. For users who bought Irma equipment before Aug. 1, the file transfer programs cost approximately $115 each on a single-user basis.

Micro-to-DEC 'pipeline' debuts

From page 17

remote computer, with RAF "trapping" the call on the micro and passing the request and parameters to the remote unit for processing, Howard said. When the subroutine has been completed, RAF passes any changed parameters back to the micro, where the program then continues.

RAF costs $395 per micro plus a mainframe charge ranging from $2,500 to $10,000, depending on the size of the system. Volume licensing is available for the micro software, with a minimum of 50 copies offered at $300 each, with additional copies then costing $125.

The software works through a standard RS-232 line and supports speeds to 19.2K bit/sec. Supported hosts include DEC VAXs and Decsystem-20s. Support for Ethernet networks is planned for delivery at the end of first-quarter 1986.

Schemes fail to stop copies

From page 17

opment Corp., Ashton-Tate, Microsoft Corp. and Quadram Co. jointly sent out a letter to other vendors inviting them to join the Association of Data Processing Service Organization, Inc.'s efforts to develop a lock-and-key scheme.

In addition to safeguarding vendors' interests, the proposal was supposed to offer "a vast array of benefits" to legitimate users, including the ability to make numerous backup and archival copies, to run packages on a diskless system off a local-area network and to check out trial offers of software.

But the scheme flopped at user sites, where it just seemed more trouble than it was worth.

Hardware-based schemes may yet emerge if system vendors get into the act. So far, the arguments to add a special port to each machine apparently have not been compelling.

The risk of antitrust lawsuits also worries vendors. But major software suppliers see meeting this challenge as a primary responsibility to their stockholders, and they'll continue to study it very seriously.

In large corporations, though, the concern may be overstated, as unauthorized duplication seems to be dropping to minimal levels.

Perhaps it's the prodding of a few highly publicized lawsuits, perhaps it's just a general raising of consciousness, but companies are establishing and enforcing serious anticopying guidelines.

Maybe standard business practices finally will succeed where technology failed.

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Diagnosing network ills

Networks pump the lifeblood of many companies, making it important always to maintain optimal network performance.

Once such a network has been installed, someone must monitor performance to ensure that grade of service goals are met and to assist capacity planning efforts. This capability often falls upon the shoulders of an MIS or telecommunications manager.

There are several approaches available to the data communications manager for monitoring network performance.

A typical gauge of network performance is response time. Ask a user how his network is performing, and often he will say, "Poorly." Users' perceptions do not reflect actual performance. Line level response time analyzers have been engineered to assist the network planner in assessing real response time. They measure the time it takes to send a message back and forth to the host, compile aggregate data such as average response time and list exceptionally long or short response times.

One problem with these devices is they only monitor one line at a time. A few small companies have begun to offer analyzers capable of monitoring eight or 16 lines.

Recently, personal computer devices

See **DIAGNOSING** page 24

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

DEC unwraps net manager

Monitors Ethernet communications paths

By Paul Korzeniowski

MAYNARD, Mass. — Digital Equipment Corp. has announced NMCC/VAX Ethernim, a network management and diagnostic tool that works on Ethernet local-area networks.

The package supplies three functions: diagnostic capabilities, the monitoring of individual network nodes and storage of network information in a data base, according to Gary Otterson, assistant manager of network product marketing.

NMCC/VAX Ethernim runs as layered software on DEC's VAX/VMS operating system and monitors Ethernet protocol and Decnet Phase IV network software, the latest release of Decnet.

The network management package performs tests on four layers of DEC's implementation of the International Standards Organization's Open System Interconnect seven-layer network model: layer one, physical link; layer two, data link; layer six, presentation layer; layer seven, application layer. For non-DEC equipment on a network, the package tests only the lower two levels.

The package isolates faults and checks connections between nodes. The on-line software tests communications paths, gathers network information and creates a real-time graphics display of a network. It can operate on any network that uses DEC's Deuna Ethernet adapters.

A manager can test the functionality of a network with a single command that initiates a probe of each node on the network and determines the integrity of the network backbone.

NMCC/VAX Ethernim automatically alerts communications managers whenever changes or additions are made to the network. The software also records other key events such as Decnet software updates and hardware controller changes. The package supplies on-line Help for every screen that a user works with.

Data concerning network performance can be entered into a data base that produces usage and performance reports.

The package sells for $10,500 for the VAX 8600 and $7,000 for all other VAX systems.

DATA VIEW

Packet services market revenue profile

Vendor — Service	Revenue (In Millions)	Market Share (%)
GTE Telenet Communications Corp. — Telenet	$120.0	42.0
Tymnet/McDonnell Douglas Network Systems, Inc. — Tymnet	94.0	33.0
U.S. Telecom Data Communications Co. — Uninet	30.0	10.5
Computer Sciences Corp. — Infonet	10.0	3.5
Compuserve, Inc. — network	5.0	1.8
IBM — Information Network	4.5	1.6
Automatic Data Processing, Inc. — Autonet	3.3	1.2
AT&T Information Systems — Net 1000	2.5	0.9
RCA Cylix Communications, Inc. — Cylix	1.7	0.6
Others	14.0	4.9
Total	**$285**	**100%**

Just-released figures show GTE still commands the packet-switched net parade.

Source: Link Resources Corp.

NEW THIS WEEK

- NCR Comten upgrades ACF/NCP
- For more on this and other new products, see pp. 37-40.

INSTANT ANALYSIS

"No two companies produce the same product, so no two MAP networks will be the same."

— Marcia Brooks, an IDC analyst

Report calls for AT&T, regionals' growth in CPE market

Monitors Ethernet communications paths

By Paul Korzeniowski

WASHINGTON, D.C. — After a slow start, AT&T and the former Bell operating companies are coming back strong. In the relatively low-growth market for private branch exchanges and key telephone systems, AT&T and the new regional companies are gaining market share at the expense of independent, non-telephone-company vendors.

That is the conclusion of the North American Telecommunications Association's (NATA) report titled "1985 Statistical Review: Annual Market Study of Telecommunications Equipment Industry." NATA is a Washington, D.C.-based trade association that represents roughly 650 manufacturers, suppliers and vendors of telecommunications equipment.

"Despite steady, albeit slow, growth for customer premise equipment markets as a whole, interconnect dealers will account for a declining share of annual customer premises equipment sales through the end of the decade," NATA reported. "With these declines, the process of market consolidation, which began in earnest the first half of 1985, will continue at least into 1987, reducing the number of independent interconnect dealers drastically." During the same period, AT&T and the former Bell companies will increase their share of annual customer premises equipment (CPE) sales. By 1989, they will account for almost 60% of all CPE sales, NATA predicted.

The survey stated that the key system market — small telephone systems — will remain flat until 1989 with approximately $2.3 billion in annual sales. The PBX market will rise slightly from $2.7 billion in 1984 to $3.3 billion in 1989.

Aggregate sales of CPE by interconnect vendors will decline from 52.5% in 1984 to 34.9% in 1989. The former Bell operating companies' share of these markets will rise from 12.5% in 1984 to 25.2% in 1989; AT&T's share will increase from 26.6% to 32.3% in 1989. These percentages are for distribution only, not actual manufacturer sales.

In the PBX market alone, interconnect's share of annual sales will decrease from 50.1% in 1984 to 33.4% in 1989. The former Bell operating companies' share will increase from 10% in 1984 to 25.7% in 1989. AT&T's share will also increase, jumping from 27.4% in 1984 to 31.5% in 1989.

Because there are fewer products sold through their channels, interconnect vendors' sales and revenues will drop from a 1983 high of $3.9 billion to $3.2 billion this year and remain flat for the rest of the decade.

"The interconnect industry is going through a period of consolidation and retrenchment," according to the study. "The number of companies competing in the market is expected to decline over the next two to three years, leaving only the best managed, those with the clearest vision for exploiting the continuing shift toward office automation and those satisfied with pursuing a geographical or technological niche. Survivors will have to reevalute their roles . . . and transform their companies from sales-driven to service-based operations."

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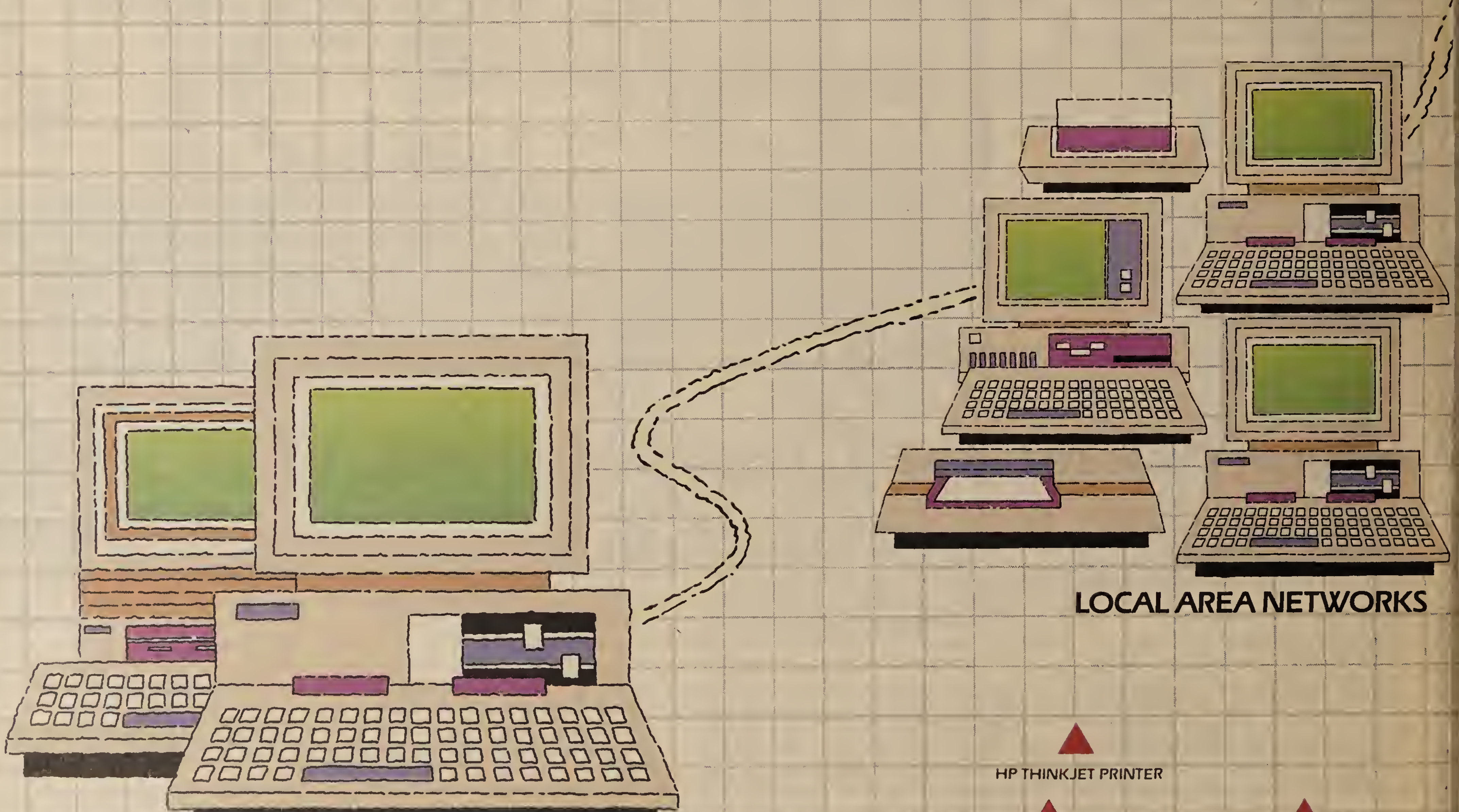

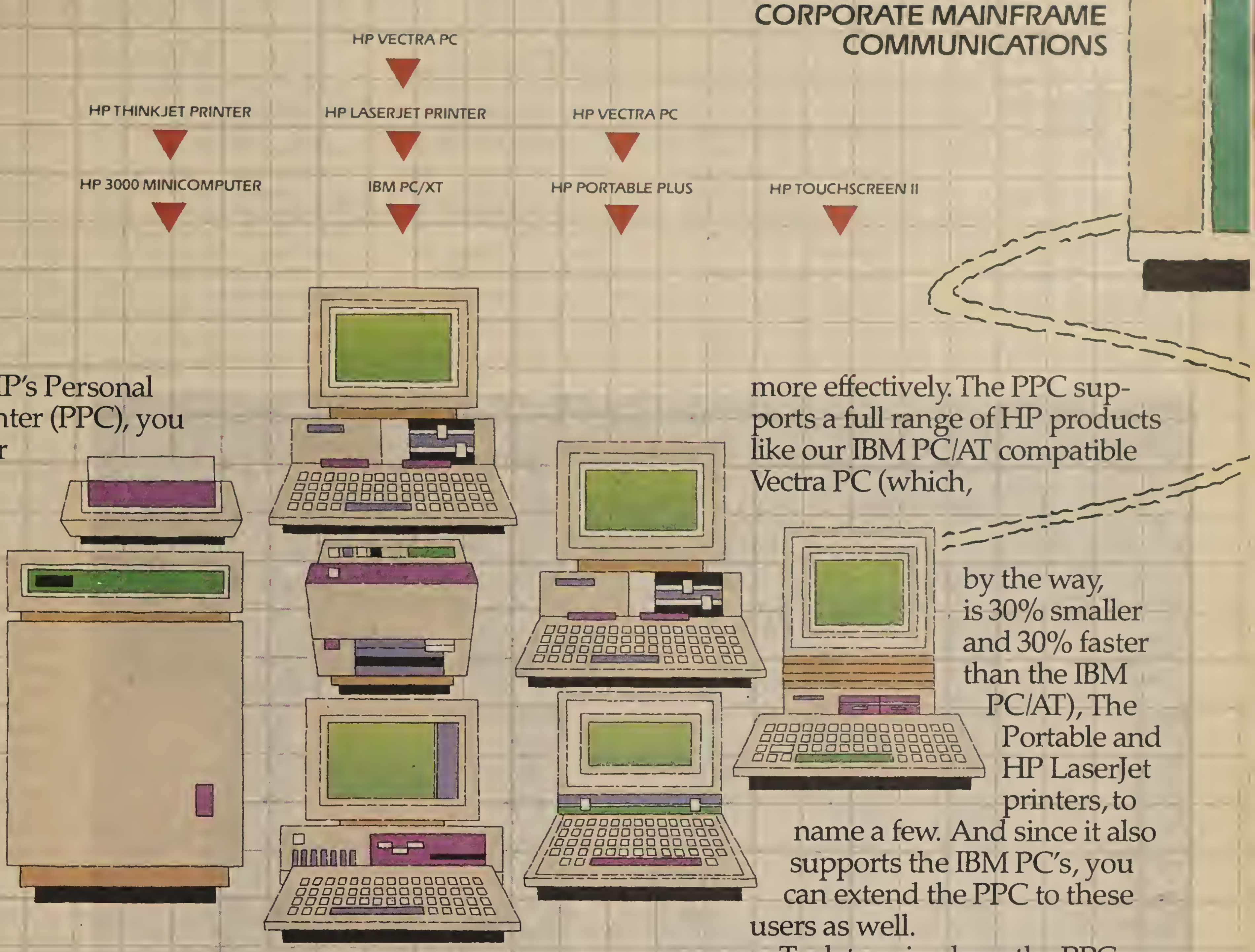

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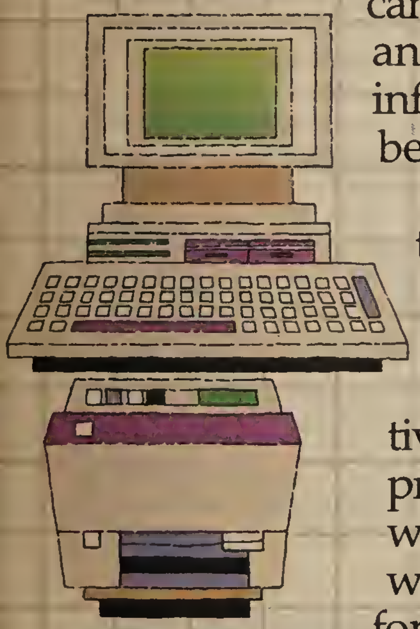

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Diagnosing network ills

From page 21

have been introduced for this function.

Vendor-developed or user-developed personal computer interfaces for data capture and statistical analysis are available. The cost of a personal computer-based one-line analyzer ranges from $3,000 to $6,000.

However, response time analyzers are not sophisticated enough to measure actual user-experienced response time fully. They make assumptions based on information they receive from the controller instead of pinpointing actual response times.

Devices that pinpoint actual response time are available from a few small companies. These use light-detecting sensors to monitor the send and receive lamps on typical IBM 3278-type display terminals. User-experienced response time is displayed numerically on an LED readout.

IBM supplies its customers with host software packages that monitor network response time.

Next up the ladder are real-time network performance and diagnostic systems, which typically run on a dedicated minicomputer, and can cost approximately a quarter of a million dollars.

Typically, response time, negative polls and Electronics Industry Association pin alarming are monitored. Color displays are often used to present some of the data.

Besides the high cost, one of the main drawbacks with these systems is that data is accessible in a sequential data base rather than in a relational data base. Sequential data bases are slow. A user must work through a tree structure, going down the tree one node at a time, and backtrack up the tree when a problem is not found in a given branch of the network.

What the telecommunications manager needs is a way to address the pertinent trouble data in a direct, relational way, along with expert system software that would condense and present the thousands of network variables in an easy-to-follow format.

The most sophisticated approach to network monitoring involves diagnostic systems built around specific modem types. These systems consist of a central controller that interrogates remote modems using so-called in-band or out-band signaling. With in-band signaling, test signals are interspersed with the main data channel, as opposed to out-band signaling, which uses a separate signal channel created at a frequency above or below the main data channel frequency.

The drawback to both systems is that they need the channel to perform the diagnosis. If the link goes down, little if any diagnostics can be performed.

A more reliable diagnostic method is to perform test signaling through a physically separate channel, such as a dial-up link. This technology usually requires existing modems to be retrofitted with equipment from another vendor to enable remote modems to be queried.

Monitoring may also be done by a third party. The drawbacks of this system are the one-time start-up cost and the fact that the needs of day-to-day communications change.

Notable among these types of diagnostic systems is the mechanized loop-testing system used by telephone companies. This approach automatically accesses a customer's loop on which a problem had been reported, verifies the condition of the loop and performs a variety of diagnostic tests.

Another tool accesses private branch exchanges remotely and tests and sets stored program control software.

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HARD TALK
Donna Raimondi
CW Senior Writer

Optical disk storage dawns

Our industry often sets up a watch for a particular technology. It happened when computers went through the stages from vacuum tubes to transistors, from transistors to integrated circuits and onto chips. It is happening now with workable parallel architecture systems.

Pundits and anxious users sit around waiting to see which vendor will be first with a product, when it will be available and — most important — how the new technology will become meaningful to users.

One of the longest watches — begun in the early 1970s — may be winding down. That watch has been for optical disk storage. Compact disks are already a fact of life for certain uses, and the much anticipated and elusive optical mass-storage device is here.

Products have been appearing that promise to provide vast improvements in the amount of material that can be stored on one disk. For example, a disk subsystem for archiving that looks like a Pertec Computer Corp. tape drive to the computer, sold by Aquidneck Data Corp. in Middletown, R.I., purports to handle the contents of 20, 2,400-ft tapes on one single-sided optical disk.

Aquidneck, which makes its living by creating custom software for large defense systems rather than by selling hardware, is somewhat surprised at the attention its less than $40,000 archiving unit has received from the public. Ninety percent of the firm's business is transacted with the U.S. Department of Defense. Its optical disk archiving unit was a by-product of a request from the U.S. Navy, which was having problems transporting disk packages from a

See **OPTICAL** page 26

ADP's project management system moved to Microvax

By James Connolly

ANN ARBOR, Mich. — Automatic Data Processing, Inc.'s (ADP) Network Services division has moved project management capabilities previously limited to large systems to Digital Equipment Corp. Microvax II-based turnkey systems.

The Apecs/8000 project management system was designed to provide project management capabilities for less than $75,000, which is less than the cost of comparable mainframe software alone, according to ADP officials.

A key feature of the Apecs/8000 is said to be the use of menus for access to predefined reports, graphics displays and data entry screens, which allows users without extensive computer training to concentrate on the actual project management details rather than on the details of the software involved.

The system includes 3M bytes of memory, a 90M-byte streaming tape, two 400K-byte floppy disk drives, a console terminal and a printer, the company said.

Supports critical path, earned value analysis

The Apecs/8000 project management module reportedly can support the critical path method as well as earned value analysis.

The turnkey system also includes a relational data base management system, custom menu definition and reporting modules, a standard menu interface and a command interface, according to the company.

Graphics modules, graphics terminals and plotters are optional features, ADP reported.

Vendor sharpens Whetstone mini

Integrated Digital hopes to cut out of Nova niche

By Donna Raimondi

ANAHEIM, Calif. — Integrated Digital Products Corp. has released a version of its Whetstone minicomputer that the vendor claims can execute 20 million instructions per second (MIPS).

The Whetstone II, a Data General Corp. Nova-compatible machine, is said to be 50% faster than the previous Whetstone Model XS-075.

The increase in speed is a result of very large-scale integration and reduced instruction set computer architectures, the vendor said.

The Whetstone II was designed to help the company break out of the Nova niche market, a spokesman said.

The 7-year-old firm's previous products were OEM systems for the Nova market that ran under Point Four Data Corp.'s Iris operating system and off-board cache memory systems.

Runs under Iris, other Nova operating systems

The Whetstone II machine can run under Iris but also supports other Nova operating systems such as Information Processing, Inc.'s Blis-Cobol; Integrated Digital's VMOS; and Dynamic Concepts, Inc.'s BITS.

Up to 1M byte of main memory can be supplemented by as many as 32M bytes of intermediate-speed memory located in an off-board cache, spokesmen for the company said.

The Whetstone II is said to provide direct memory access (DMA) execution overlap, with a DMA transfer time of 800 nsec.

The unit, primarily sold to OEMs, comes with 128K bytes of main memory, Integrated Digital reported.

It includes the chassis, a 60A power supply and documentation for a suggested retail price of $30,000, according to the company.

NEW THIS WEEK

- CIE Systems offers two multiuser business systems
- NNC Electronics introduces the Atlas minicomputer
- For more on these and other new products, see pp. 37-40.

INSTANT ANALYSIS

"We have failed to do better than our present architecture with RISC machines. We are still trying but haven't been able to do it."

— Ken Olsen, founder and president of DEC

Humanities take a course in automation, save a bundle

Wang helps NEH cut the cost of patronage

By Donna Raimondi

WASHINGTON, D.C. — The National Endowment for the Humanities (NEH) saves the price of a million pages of paper a year. It has more than paid for its management information system through savings of time, money and effort since automating in 1978.

In the late 1970s, President Carter called for better management in the federal government to achieve operational efficiencies and higher productivity. In response, the NEH bought a Wang Laboratories, Inc. VS 80 office automation system, according to Carlos Rice, director of ADP Systems Office for the agency.

The agency, which gives grants in the humanities to individuals and institutions, reports directly to the White House. It had not used automation since its inception in 1969. Two contract services, used for label generation and other clerical functions, absorbed nearly $200,000 a year of the agency's budget to help administer its network of programs.

Rice was brought into the agency from the U.S. Department of Health, Education and Welfare, where he had conducted extensive studies on automation. From what he learned, he decided to buy the Wang system. Rice based his choice on observations that it was fairly easy for employees with no computer experience to learn on a VS 80, that the system could handle both word processing and data processing functions and that the cost could be recovered through MIS-generated savings. The latter point was important because the NEH had no budget for automation, he said.

Each of the 23 offices in the agency that were responsible for different activities had designed two- to six-page forms to send to potential grant applicants. The forms package that was sent to the half million potential applicants per year included five to 10 gummed labels and an acknowledgment postcard that the applicant was instructed to fill out and return to the agency. The NEH would then send the postcard back to the applicant to say that the forms were received, and the labels would be used for further correspondence.

Rice carefully examined the information requested on the forms and distilled all the requested data into one form that would serve all departments. It was possible to eliminate many of the forms' questions because the system could supply information formerly requested from the applicant. For example, a congressional district could be determined by the system immediately. In the past, it took a staff member some time to look the information up if the data was not on the form.

Rice eliminated the postcard since the system could generate a response automatically. The labels, previously sent out to all potential applicants, now are generated by the machine and go only to the approximately 17,000 people who apply. Information from the single-sheet form is put directly into the system, Rice said.

See **HUMANITIES** page 26

Optical disk storage dawns

From page 25

development site to its cruise missile sites without damaging the disks. "Optical disks looked like a perfect solution, because they can't really be damaged," according to George Steele, program manager at Aquidneck.

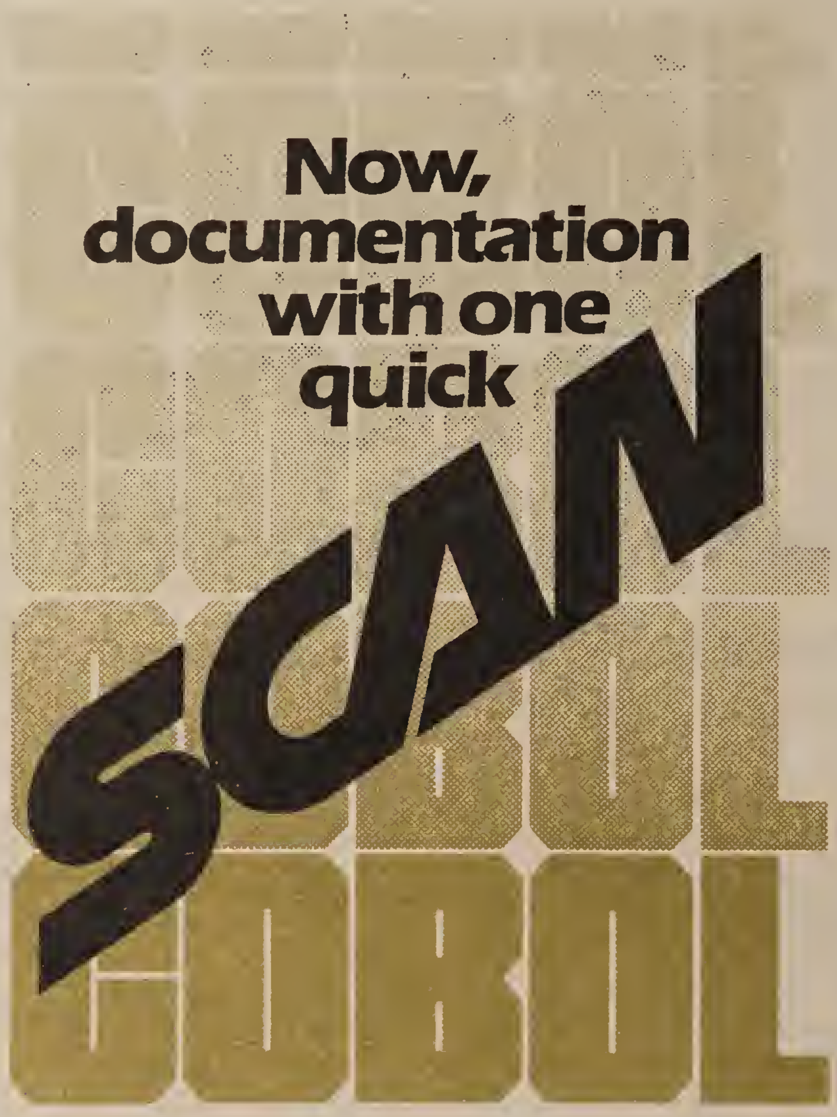
Once the units were developed for the Navy, Aquidneck's disk supplier, Alcatel Thomson Gigadisc, asked to demonstrate the unit at a couple of industry shows. The attention thus generated inadvertently pushed Aquidneck into the limelight.

In a recent interview, Steele talked about the history of optical disk storage, which has been fraught with problems. Error rates on optical storage media were too high for data storage, so a battery of researchers went to work to find better materials, he said. At the same time, developers looked for methods to reduce errors via controllers that could tolerate the media's movements as the disk turned.

The disks evolved from stamped plastic to a variety of glasses, metals and plastics sandwiched in ordered layers to create the optimum environment into which the laser could burn. The burning process — or writing on the disks — has been accomplished in a number of ways, Steele said. The medium can be pitted or bubbled. It can undergo changes in its crystalline makeup, and it can be magnetized in one direction and written on at the same time.

Despite limitations, it seems that optical disks are here to stay. They are useful for the kinds of permanent archiving and prolonged data preservation applications that facilities such as libraries, hospitals and insurance companies need.

Steele said that research continues into methods that will allow erasable disks. It will be about 18 months before someone comes up with an erasable optical disk, he said, based on what he knows about the research that is occurring. Other vendors said that it will be at least two years before erasable disks are real. But after such a long wait, two years almost seems like a short time.



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Humanities take course

From page 25

In March 1984, the NEH upgraded to a VS 100. That move, Rice reported, was possible only as a result of the cost savings generated by the smaller system.

Today, the agency's all-Wang installation includes a central processor with 2M bytes of main memory, three 75M-byte and two 288M-byte disk drives. Also part of the configuration are 18 printers and 46 workstations, all but seven of which handle both data processing and word processing functions. The system supports the 13-member ADP Systems Office as well as up to 225 users ranging from secretaries and program officers to high-level management officials in all five operating divisions of the agency.

Before the in-house system, NEH staff individually typed and proofread courtesy letters to each grant applicant months ahead of time. Now, because all necessary information has already been keyed into the system, these same letters are prepared with a lead time of a few hours.

The system augments daily a series of special checks and balances built into the multitiered process that leads — in about one of four cases — to the awarding of a government-sponsored grant for projects in the humanities.

With all essential information on the grants in a central data base that was designed in-house, the agency can retrieve information in many more ways than before. It can, for example, perform comparative analyses of the active proposals.

The typical grant application requires about four months to move through a full cycle. "No one applies for a grant without following through on its status," Rice said. "Because we get so many inquiries from grant applicants about the progress of proposals, we have deployed terminals throughout the agency to handle this heavy volume of requests."

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One-time passwords fortify system security

Security problems associated with static passwords force DP managers to consider alternatives. Randomly generated one-time passwords may plug the gaps in security ramparts.

By Raymond Wong

Most end-user authentication techniques for computer systems rely on something users know (such as a password or a piece of personal information), something they have (a key or a card) or something they are (a fingerprint or voice print). For example, in using a plastic card and a personal identification number to gain access to a bank's automated teller machine, you are using something you have and something you know.

The password has been the most popular method of authenticating users for remote access to host computer systems. Passwords are inexpensive and do not require an additional purchase, since they usually come as part of a system's operating system. They appear easy to administer and require little of the user.

Yet many security problems are associated with passwords. These problems force DP managers to consider alternative solutions carefully. Among these problems are the following:

- Passwords are fairly static quantities; they do not change for some time. The longer a password is valid, the greater the probability of its being compromised.
- Passwords are subject to careless handling by users. How often have we heard about users writing their passwords on a sheet of paper and taping them to their terminals or lending their passwords to a coworker?
- Passwords are vulnerable if the communications link between the user's terminal and computer is not protected either physically, through the use of concrete conduits or other special line shields, or by using data encryption between the end points of the link. An unprotected link is subject to electronic eavesdropping.
- Passwords are often chosen by users to be easy to remember. How often have we heard of using spouses' names, telephone numbers and other information that has high correlation with a user's personal background? This allows a person who has some knowledge of a user to make intelligent guesses at the user's password.
- Some passwords are found in dictionaries or directories. This allows a resolute hacker — even one unfamiliar with the user — to make an exhaustive search attack on the password.

Old concept, new use

In recent months, a number of user authentication products have appeared on the market that attempt to address the problems associated with passwords. These products are based on the concept of a one-time password.

Unlike typical passwords, a one-time password is no longer valid after it has been used once. Since successive one-time passwords are randomly selected, a user authentication system based on this method can be used reliably over unprotected communications links.

An eavesdropper can record all one-time passwords used in the past but still have no information to determine the next valid one-time password. In addition, this technique does not have the problems associated with guessing and exhaustive search attacks.

Though new to the computer arena, one-time passwords have been in use for a number of years. The government, for example, chose one-time passwords to identify friendly aircraft because they offer the greatest level of protection. But they can be awkward to implement.

Traditionally, each party in the authentication needed a list of randomly selected passwords. This poses problems in a computer system environment, where a computer user must be authenticated by a central host.

First, the list must be securely generated and distributed to the users and to the central computer.

Raymond Wong is manager of special projects for the data security division at Sytek, Inc., Mountain View, Calif. He is a member of the ANSI X.9E9 Key Management Working Group, which sets security standards for the financial community. His own patent for a personal authentication device is pending.

Second, the list must be securely stored — a minor difficulty at a central site but a formidable challenge for portable units used by personnel in remote sites.

Third, both the user and the central computer must know which is the next valid one-time password. In effect, the parties must synchronize their use of the list of one-time passwords while not giving away the password system itself.

Challenge-response

New products solve these problems by using a challenge-response protocol between the central computer and the user. Each authorized user receives a personal password generator, a portable device that does not store a list of one-time passwords but instead generates a password on demand.

After the end user identifies himself to the host computer by inputting his user name, the computer responds with a "challenge number." The user's personal password generator responds to the challenge number by generating a one-time password that the user can key in to gain access.

Each user should operate with a different set of one-time passwords. Also, for the same challenge number, two personal password generators must not compute the same response. Therefore, each user's personal password generator must be unique in some way.

Keeping secrets

The most common method of ensuring this is to use a cryptographic algorithm to generate each response to a challenge number. In this method, each user's password generator has a different secret "key" — a set of data used in the response computation.

The password generator then assigns a password based on the algorithm and the key data. The combination of the two ensures that the responses generated are unpredictable and that different password generators will not return the same one-time password for a given challenge number.

A number of products have been introduced that are based on a challenge-response protocol and a personal password generator. With these products, the user either manually inputs the challenge number into the generator as the challenge number is output on the computer screen or reads that number off the screen, using an optical character reader on the hand-held password generator. The password generator then returns the one-time password on its own display for input into the computer.

Products differ in some other areas. Some require the user to input a personal identification number in order for the password generator to calculate the response correctly. Others differ by how many digits comprise the challenge number and the response. A lengthy number boosts the probability that a randomly generated challenge number will not be issued twice.

If this is not sufficient for a site's security needs, some products allow the host computer to track which challenge numbers have been issued to which users and to suppress repetition — a variation on random generation.

There are, of course, other alternatives for enhancing the security of static passwords. Callback systems and exhaustive data encryption offer some advantages.

But solutions such as these have their own vulnerabilities. Some determined hackers have defeated callback security systems by call-forwarding the telephones of authorized users. And encryption only answers one of the weaknesses of static passwords — vulnerable communications links.

One-time passwords are now being used for remote access to host computers by several types of installations: the U.S. Department of Defense, large corporations with sensitive data that must be accessed by remote locations and financial institutions that use them both to authenticate employees involved in transferring large sums electronically and to identify large customers wanting dial-in access to accounts or financial data.

Not every installation requires the level of security provided by one-time passwords. But for those that do require extra security for remote access to hosts, one-time passwords provide added protection at relatively low cost. ■

The personal computer that raised high performance to new heights.

If you work with high volumes of information, you need answers fast.

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Which is why IBM created the Personal Computer AT® system. It's changed a lot of ideas about business computing.

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There are new definitions of "power" in a stand-alone PC. While phrases like "sharing files" and "multi-user systems" are being heard more often.

And surprisingly, words like "affordable" and "state-of-the-art" are being used *together.*

Clearly, the Personal Computer AT is different from anything that came before. And what sets it apart can be neatly summed up in two words.

Advanced Technology.

If you've ever used a personal computer before, you'll notice the advances right away.

To begin with, the Personal Computer AT is extraordinarily fast. That's something you'll appreciate every time you recalculate a spreadsheet. Or search through a data base.

It can store mountains of information—literally thousands of pages' worth—with a single "hard file" (fixed disk). And now you can customize your system to store up to 30,000 pages with the addition of a *second* hard file.

The Personal Computer AT runs many of the thousands of programs written for the IBM PC family. Like IBM's TopView, the program that lets you run and "window" several other programs at once.

Perhaps best of all, it works well with both the IBM PC and PC/XT. Which is welcome news if you've already made an investment in computers.

You can connect a Personal Computer AT to the IBM PC Network, to share files, printers and other peripherals with other IBM PCs.

You can also use a Personal Computer AT as the centerpiece of a three-user system, with your existing IBM PCs as workstations.

Most important, only the Personal Computer AT offers these capabilities *and* IBM's commitment to quality, service and support. (A combination that can't be cloned.)

If you'd like to learn more about the IBM Personal Computer AT, see your Authorized IBM PC Dealer, IBM Product Center or IBM marketing representative. For a store near you, call 1-800-447-4700 (in Alaska, call 1-800-447-0890).

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A security checklist

By August Bequai

The Chamber of Commerce of the U.S. reports that losses from computer crimes cost companies more than $100 million annually. Some law-enforcement sources place this figure as high as $1 billion. Experts note that more than 80% of these crimes could be detected and prevented if companies were to establish adequate security protection.

No security program is safe from clever criminals. Management, however, can and must play a role in preventing and detecting computer crimes.

Managers should use the following checklist to help formalize their security needs.

PERSONNEL SECURITY

☐ Always perform background checks for prospective DP employees.
☐ Conduct periodic background checks for all employees with any access to the computer facility.
☐ Bring employee-related problems to the attention of the appropriate supervisors.
☐ Establish a program for handling employee-related problems.
☐ Brief security personnel on all laws and regulations regarding employees.

HARDWARE SECURITY

☐ Correlate meter hours with utilization hours.
☐ Review maintenance activities.
☐ Verify all downtime.
☐ Check incoming work against the list of authorized users.
☐ Conduct periodic spot checks to ensure minimum abuse of the system.
☐ Identify all terminals.
☐ Check all hardware changes, repairs and modifications.

SOFTWARE SECURITY

☐ Place unused tapes in their containers.
☐ Select a reputable contractor to clean disk packs.
☐ Maintain detailed utilization records.
☐ Prepare and maintain backup tapes and disks.
☐ Locate the tape library in a secure area.
☐ Store tapes away from magnets.
☐ Employ key words or passwords wherever possible. Change these words frequently.
☐ Employ data scrambling and cryptographic devices.
☐ Verify and record modifications to software.
☐ Employ tests.
☐ Keep a log of all personnel who have access to sensitive data.
☐ Record unauthorized attempts to access the system.
☐ Control and log access to sensitive areas by maintenance personnel.
☐ Use escorts for any personnel who have not been cleared.
☐ Supervise vendor activities.
☐ Request that vendors screen employees who have access to sensitive data.

DATA CONTROLS

☐ Keep updated inventories of all records.
☐ Check the accuracy of the backup system.
☐ Maintain backup source data.
☐ Record and classify all programs.
☐ Investigate all stoppages.
☐ Maintain duplicates of all documentation. File duplicates in a separate facility. Take periodic inventories.
☐ Allow only approved program changes.
☐ Classify data in terms of its value.
☐ Segregate tapes, disk and cards.
☐ Make storage areas secure and fireproof.
☐ Educate system personnel in data security.
☐ Set user input controls.
☐ Monitor output.

TERMINAL SECURITY

☐ Control terminal access.
☐ Employ guards and physical barriers to control access to terminals.
☐ Guard portable terminals from theft and misuse.
☐ Control access to key-word and lock-word files.
☐ Monitor time-sharing systems for proper use.
☐ Test the system for electronic interceptions. ■

August Bequai is a Washington, D.C., lawyer. His seventh book, Techno-Crimes *(D. C. Heath, Lexington, Mass.), will be released in 1986.*

WE CHALLENGE ALL COMERS TO A LASER BATTLE.

DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counterproductive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

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FASTER AND MORE FLEXIBLE THAN DOT MATRIX.

The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

At 8 pages per minute, the LN03's speed approaches that of a line printer. The fact is, it's faster than both your dot matrix and daisywheel printer working together.

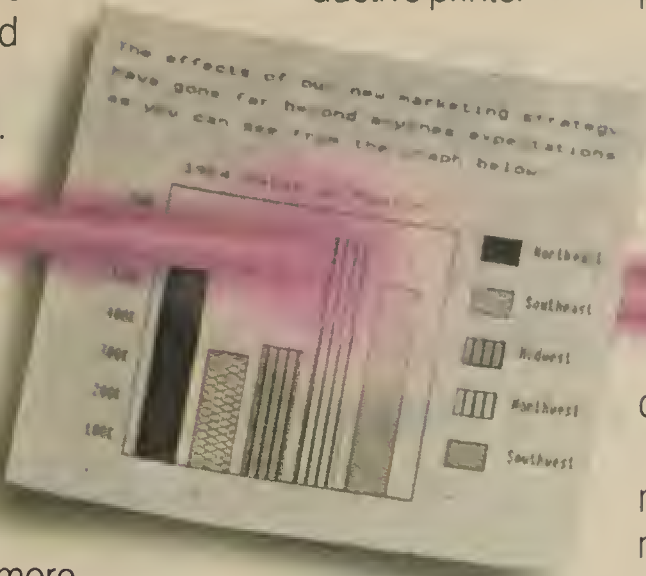
Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing. And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities. A professional look. Which makes the LN03 the most productive printer you can buy for the money.



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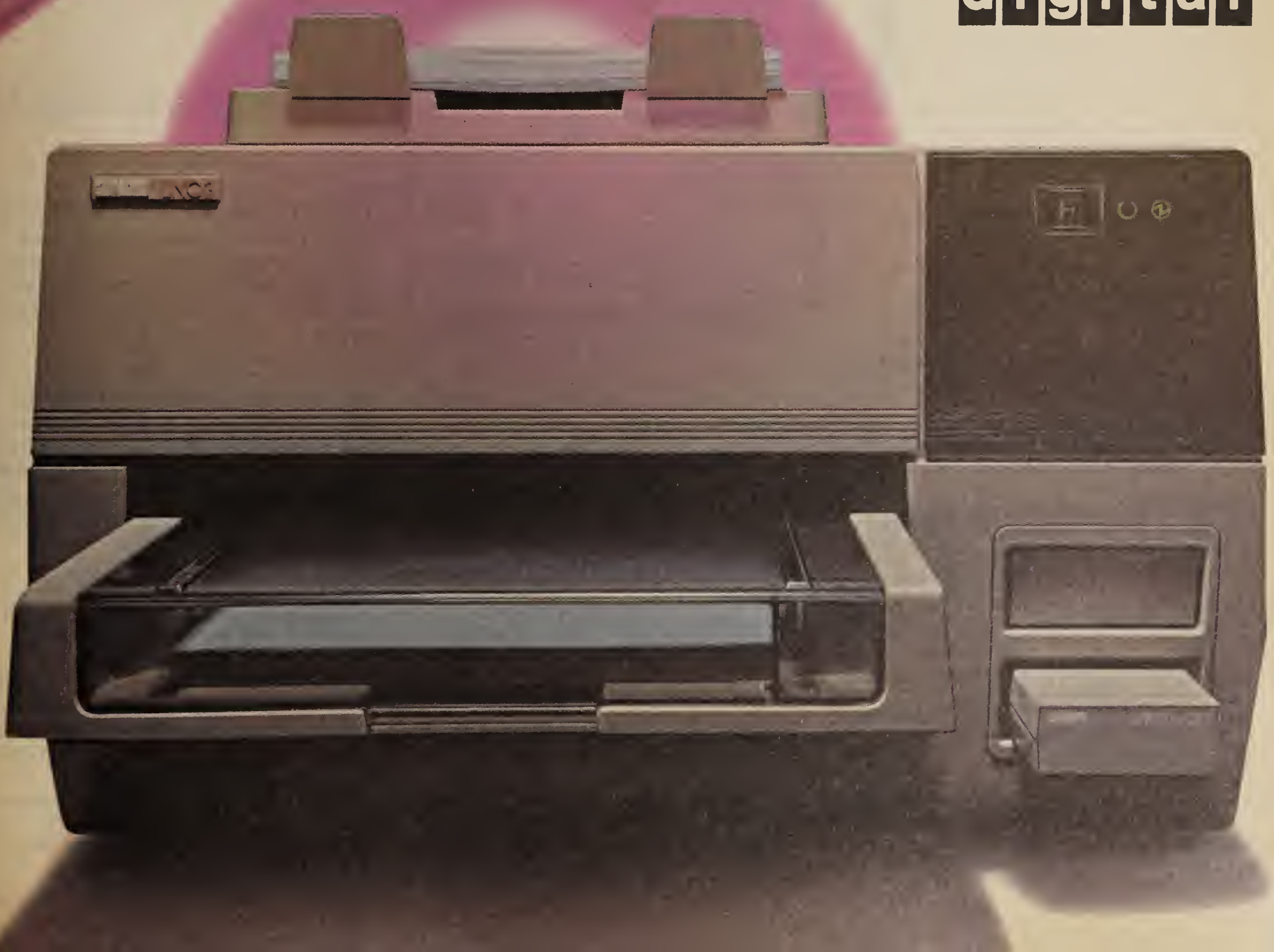

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NEW PRODUCTS

Epson rolls out desktops

Equity micro line boasts 16-bit IBM compatibility

Epson America, Inc. of Torrance, Calif., has introduced the Equity line of IBM-compatible 16-bit desktop computers.

Equity I is IBM Personal Computer compatible. The base configuration, priced at $995, comes standard with an Intel Corp. 8088 microprocessor; 256K bytes of random-access memory (RAM), expandable to 640K bytes; a 360K-byte, 5¼-in. floppy disk drive; an IBM Personal Computer AT-type detachable keyboard; a built-in Centronics Data Computer Corp. parallel printer port; an RS-232C serial port; and Microsoft Corp. MS-DOS 2.11 and GW-Basic.

The two other available configurations — dual floppy disks or a single floppy with a 20M-byte internal hard disk — are priced at $1,295 and $2,195, respectively.

Equity II is IBM Personal Computer XT compatible. It comes in two basic configurations: the base system, priced at $1,695, includes a single 360K-byte floppy disk; the other option, priced at $2,895, includes one floppy and a 20M-byte internal hard disk.

Equity III is IBM Personal Computer AT compatible. Two modes of operation allow the system to act as either a single-user or multiuser processor. The basic configuration costs $3,495 and comes with a single half-height, high-density, double-sided 1.2M-byte floppy disk drive. A second configuration costs $4,495 and adds a half-height, 5¼-in. 20M-byte internal hard disk.

Equity I is Epson's first entry into the Personal Computer-compatible market.

Equity III features an Intel 80286 microprocessor, eight IBM-compatible expansion slots, both floppy and hard disk controllers, 640K bytes of RAM, a detachable IBM Personal Computer AT-type keyboard, parallel printer port, an RS-232C serial port and a real-time clock/calendar. Microsoft's MS-DOS 3.1 and GW-Basic are included.

There is a full line of Epson components and peripherals available for the Equity line.

Equity I is available now. Equity II and Equity III will be available in February.

High-capacity Atlas 130 debuts

NNC Electronics Corp. of Huntington Beach, Calif., has unwrapped the Atlas 130 to expand its product line of high-capacity, multiuser, multitasking computer systems.

Atlas 130 features a 130M-byte unformatted hard disk with a 25-msec access time; 10 software-selectable serial ports with speeds up to 38.4K bit/sec.; one parallel Centronics Data Computer Corp. interface port; 576K bytes of CMOS dynamic random-access memory; an 8-in. look-alike 5¼-in. 1.6M-byte floppy disk; and a full start/stop, 6,400 bit/in. cartridge tape drive capable of holding 18M bytes per tape cartridge.

Atlas 130 runs Phase One Systems, Inc.'s Oasis 8 multiuser operating system. It includes a switched fused 110-Vac convenience receptable, a 50-pin connector for an external 8-in. floppy drive and an additional 50-pin connector.

Atlas 130 costs $11,400, including the cartridge tape unit.

CIE systems now support eight, 64 users

CIE Systems, Inc. of Irvine, Calif., has expanded its family of multiuser business systems with the introduction of eight-user and 64-user models.

The CIES 680/30-25 was designed for up to eight users. The standard configuration includes the AT&T Unix, Ryan-McFarland Corp. RM/COS or Pick Systems Pick operating system, a 25M-byte Winchester hard disk and a 500K-byte, 5¼-in. IBM-compatible floppy disk drive.

The 680/30-25 is equipped with an 8-MHz Motorola, Inc. 68000 CPU and 512K bytes of internal memory, expandable to 768K bytes. Winchester storage can be expanded to 50M bytes. An optional 60M-byte streaming tape drive is available. A 9-slot Intel Corp. Multibus chassis with a hinged card cage provides access to expand the system with Multibus-compatible controllers and interface cards.

The system can support two parallel printers with speeds up to 600 line/min.

The 680/30-25 is priced starting at $5,995 for a standard single system.

The CIES 680/250 was designed for up to 64 users. The standard configuration includes either the Pick or RM/COS operating system and 337M bytes of on-line disk storage expandable to 1.3G bytes. The standard 2M-byte memory can be expanded to 4M bytes for Pick users and up to 8M bytes for RM/COS users.

The 680/250 incorporates a 16.6-MHz Motorola 68020 CPU with on-board memory. The CPU is implemented under the Intel local bus extension to facilitate 19M byte/sec. data exchange and manipulation between the CPU and memory.

The system has three intelligent Intel 8088-based I/O controllers with 64K bytes of on-board random-access memory each. There is also an intelligent disk controller and a 1,600 or 1,600/3,200 bit/in. ½-in. tape drive. Options include an IBM-compatible 5¼-in. floppy disk drive and a 60M-byte, 90 in./sec. streaming tape drive with start/stop operation.

The 680/250 is priced starting at $59,995 for the standard configuration.

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Dataease 2.5 offers improved functions, fewer keystrokes

Software Solutions, Inc. of Trumbull, Conn., has introduced an enhanced version of its Dataease data base management program, offering a new procedural language and beefed up financial and scientific functions.

Dataease 2.5 comes with the menu-driven Dataease Query Language, which provides users with prompts and Help messages, and the ability to give commands with fewer keystrokes, according to a company spokesman.

The software also has the high-level query language used with the earlier Dataease version, the spokesman said.

The purpose of both packages reportedly is to appeal to a full range of users.

New functions include calculation of present value and rate of return. Other features include a library report template for quick generation of reports, a speed-view function for related file records and an interface to Lotus Development Corp.'s 1-2-3 application program.

Designed for the IBM Personal Computer and compatibles, Dataease 2.5 is priced at $600. Current Dataease users can upgrade for $50. Subscribers to Serviceease, the company's support program, can upgrade for free.

Geisco service to exchange companies' data electronically

General Electric Information Services Co. of Rockville, Md., has introduced the EDI Express system, an applied teleprocessing service designed to provide the electronic exchange of business documents between companies.

Electronic data interchange replaces traditional business procedures in which purchase orders, invoices, bills of lading and other business documents are typically printed out on one company's computer system, mailed and re-entered into the computer system of a vendor or a customer. With electronic data interchange, the entire process is electronic and the document transfer is almost instantaneous.

The EDI Express system allows documents to be automatically translated to industry-standard formats, stored for retrieval and dispersed to multiple recipients.

Some of the EDI Express system's capabilities include electronic mailboxing, compliance checking, optional access modes, format translation, special editing, transaction billing and status reports.

EDI Express is priced on the basis of the number and size of the documents handled, whether special functions like translation are performed and the time of day transmission occurs.

SOFTWARE & SERVICES

Systems software

Burroughs Corp. introduced the **Data Transfer System**, a software package that links its B20 microcomputers to its entire line of mainframes, from the B1000 to the top-of-the-line A 15.

The system is made up of two software modules — one that runs on the micro and the other on the mainframe. Data can be transferred to and from both environments. Micro data can be merged with mainframe data, and mainframe data can be downloaded into micro software programs.

The mainframe module costs $50 per month or $1,500 for a one-time 48-month extended license. The micro module costs $525 for the first 10 B20s. The module for each additional micro costs $55.

Burroughs, Burroughs Place, Detroit, Mich. 48232.

■

Chicago-Soft Ltd. has enhanced **Netspy,** its network performance monitor, to monitor CICS host and network response times without having to run CICS in a systems network architecture definite response mode.

Other functions include an ability to record response time and traffic statistics per application and per terminal; to measure last, worst and average response times; and to monitor user service levels.

A perpetual license costs $12,500, the vendor said.

Chicago-Soft, Suite 2, 738 N. LaSalle St., Chicago, Ill. 60610.

Productivity aids

Incatec International, Inc. has introduced **Documaster**, a software program that can produce programmer manuals from code designed for AT&T Unix-based computer systems.

It prepares a file from programmer's code, making it ready to be TROFFED or NROFFED under Unix to a laser or letter-quality printer.

Documaster runs on Digital Equipment Corp. VAX, Convergent Technology, Inc. and other Unix System V or University of California at Berkeley 4.2 systems or on IBM Personal Computers and Personal Computer XT running Xenix.

Single site licensing is available for $495.

Incatec, Suite 818, 7700 Edgewater Drive, Oakland, Calif. 94621.

Application packages

CVNC and **Personal Machinist**, two numerical control applications packages have bowed from **Computervision Corp.**

CVNC integrates with the vendor's CADD 4X software, allowing programmers to work from any geometry in the computer-aided design and drafting design data base and then interface with software for downstream applications. CVNC is available for CDS 4000 and Designer V-X systems.

The Personal Machinist is a design and manufacturing system for the IBM Personal Computer AT with 512K bytes of memory. It operates stand-alone, as part of a network or combined with other Computervision systems.

CVNC comes in three modules: 2-axis turning for $15,000; 2- and 2½-axis milling for $15,000; and milling/turning for $25,000.

The Personal Machinist prices are $20,500 for a standard system and $21,700 for an advanced system.

Computervision, 15 Crosby Drive, Bedford, Mass. 01730.

Data base management systems

Relational Technology, Inc. has announced **Version 4** of its **Ingres** relational data base management and applications development system.

Version 4 allows users distributed access to all Ingres data bases connected in a computer network.

Enhancements also include function key support, Help facilities and a menu-driven facility for the query languages. It supports both SQL and QUEL query languages within the VMS and AT&T Unix environments.

Ingres Version 4, available in February, is priced from $7,500 on the DEC Microvax to $90,000 on IBM mainframes.

Relational Technology, 1080 Marina Village Pkwy., Alameda, Calif. 94501.

Languages

Century Analysis, Inc. has unveiled **ADF/10**, an applications development language for NCR Corp. mainframes running VRX that reportedly lets users develop programs interactively and test code interpretively.

The software converts source modules into executable object code without the need to compile or link edit files.

ADF/10 contains macro commands that provide on-screen prompts that guide users through the coding process with questions pertaining to the specific application.

ADF/10 costs $10,000.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

MICROCOMPUTERS

Software

Apple Computer, Inc. has introduced **Version 1.3** of its **Appleworks** integrated software package for the Apple IIe and IIc personal computers.

Appleworks combines word processing, data base management and financial modeling. The new version supports Apple's Unidisk 3.5 disk drive and Apple II Memory Expansion Card.

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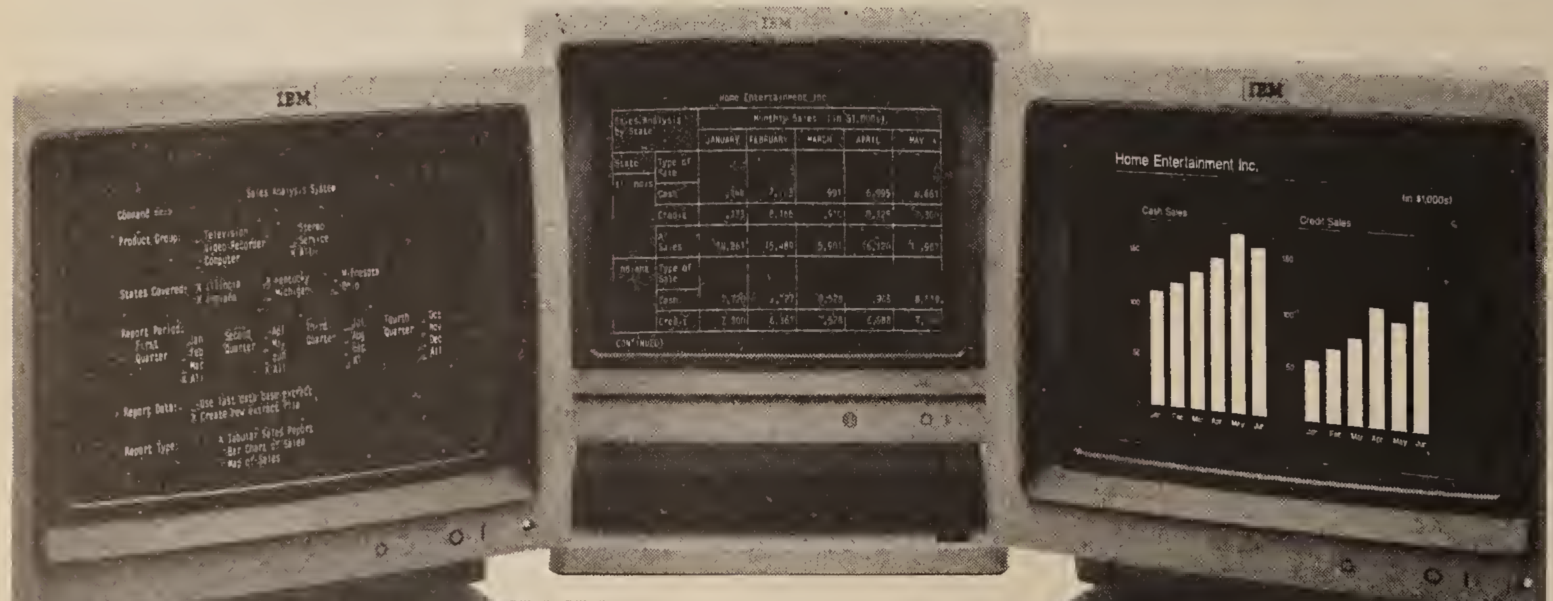

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Appleworks 1.3 allows users to access Unidisk 3.5, format a 3½-in. disk from within Appleworks, use the Memory Card or the Extended 80-Column Card as a random-access memory disk and work with Catalyst 3, Quark, Inc.'s mouse-based program selector. It costs $250.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.

Systems

A turnkey **digital optical disk-based document image storage and retrieval system** designed for use with an IBM Personal Computer was announced by **Acctex Information Systems, Inc.** and **Talus Corp.**

The workstation consists of a Personal Computer-based 5¼-in. 100M-byte writable optical disk system with a desktop scanner/digitizer for document-image input, a full-page monitor for document display, a laser/graphics printer for image printing and the Cosmos Revelation relational data base software package.

The system costs $39,900.

Acctex, Suite 600, 131 Stuart St., San Francisco, Calif. 94105.

■

NCR Corp.'s Personal Computer Division has introduced **InteracTV-2**, an enhanced version of its InteracTV interactive videodisk system.

The system allows simultaneous display of video images and computer-generated text and graphics while offering dual-channel sound.

The system combines a color graphics board, a video controller board, an analog red-green-blue monitor, cabling and Interactive Training Systems, Inc.'s ITS Authority software with an NCR PC6 personal computer.

A system, including personal computer, 256K bytes of internal memory, dual floppy disk drives, monitor, videodisk player, speakers and software, costs about $8,500.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Communications

Cygnet Technologies, Inc. has introduced **Get,** an electronic mail search and retrieval program for IBM Personal Computers and compatibles that works underneath other applications.

Get comes with the specifications to check the mailboxes of seven major on-line services and will flash a mail-waiting message in the upper right corner of whatever program the user is working on.

Get will be available for $49.95 in January.

Cygnet Technologies, 1296 Lawrence Station Road, Sunnyvale, Calif. 94089.

■

Software Ventures Corp. has introduced **Microphone**, a communications package for Apple Computer, Inc.'s Macintosh said to automate the telecommunications process.

The package lets users build macros either by activating a "watch me" mode in which the program records a session's keyboard commands and system prompts or through a Script window that displays a set of functions that users can link. A "start-up" mode conducts an entire session from logon to logoff without user intervention.

Microphone is priced at $74.95.

Software Ventures, Suite 220, 2907 Claremont Ave., Berkeley, Calif. 94705.

Storage

Quadram Corp. is offering a line of full- and half-height hard disk drives, including **Quaddrive Models 10MB**, **20MB** and **72MB**, for the IBM Personal Computer, Personal Computer XT and AT.

Quaddrive 10MB is an internal 3½-in. drive in a 5¼-in. form factor with 10M-byte formatted capacity. Average access time is 75 msec. It includes an upgradable controller card which can be configured for use with larger disk drives. The 20MB, also an internal half-height drive, provides a 5¼-in. form factor, 20M-byte formatted capacity and 85-msec average access time.

The 72MB is a 5¼-in. internal full-height disk drive with 72M-byte formatted capacity. It has a 28-msec average access time and can be used with local-area network file servers.

The 10MB sells for $945. Quaddrive 20MB prices are $1,195 for IBM Personal Computer and Personal Computer XT versions and $1,095 for an AT. For the Personal Computer and Personal Computer XT, Quaddrive 72MB costs $3,995, while an AT version lists for $3,795.

Quadram, One Quad Way, Norcross, Ga. 30093.

COMMUNICATIONS

Software

Computer Vectors, Inc. has introduced **Version 4** of **Rcom**, its communications software package for IBM Personal Computers and compatibles.

Version 4 includes Digital Equipment Corp. VT100 terminal emulation and a user-definable terminal table allowing users to establish their own terminal support.

Rcom allows the personal computer user to connect to another personal computer, to communications networks, services and data banks or to a mainframe computer.

Rcom is priced at $69.95.

Computer Vectors, Suite 206, 22661 Lambert St., El Toro, Calif. 92630.

■

NCR Comten, Inc. has announced **Version 3** of the **Comten Advanced Communications Function/Network Control Program (ACF/NCP).**

Comten ACF/NCP resides in a Comten 3650, 3690 or 5620 communications processor and performs network routing functions.

Version 3 includes value-added and IBM ACF/NCP Version 3-compatible functions such as switched-line

Continued on page 40

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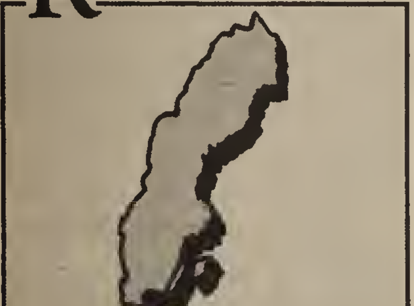

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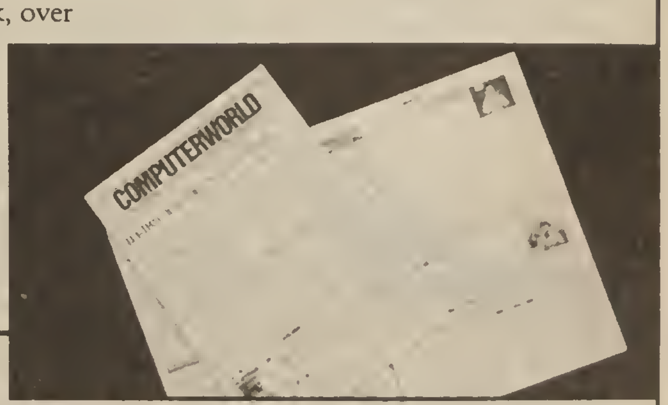

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Continued from page 39

IBM Binary Synchronous Communications 3270 terminal support.

The license fee is $1,440. The monthly continuing license fee is $360.

NCR Comten, 2700 Snelling Ave. N., Saint Paul, Minn. 55113.

Multiplexers/modems

Artel Communications Corp. has announced the **MX8**, a fiber-optic multichannel RS-232 data link.

The MX8 can replace up to eight copper cables with a single multifiber optical cable. It can connect a host computer to terminals and peripheral devices up to three miles away.

The eight-channel MX8 multiplexer was designed for asynchronous applications at data rates up to 9.6K bit/sec.

It costs $1,650 per pair.

Artel Communications, P.O. Box 100, W. Side Station, Worcester, Mass. 01602.

■

Equinox Systems, Inc. has introduced the **LM-8**, a local multiplexer that provides a way to pass eight channels of data and associated control signals up to a mile over a single two-pair cable.

The LM-8 can be used in pairs to connect clusters of terminals to a computer or integrated with an Equinox Data private branch exchange for switching and port-sharing applications. It uses custom very large-scale integration technology.

The LM-8 is priced at $700.

Equinox Systems, 12041 S.W. 144 St., Miami, Fla. 33186.

SYSTEMS & PERIPHERALS

Turnkey systems

Integrated Digital Products Corp. has announced the **Whetstone Ally**, a mini-mainframe that accommodates up to 32 ports running under the Point Four Data Corp. Iris operating system.

The Whetstone Ally chassis accommodates standard-size 15-in. by 15-in. boards. It has nine slots, with one devoted to Integrated Digital's XS-150 CPU and one to the its I/O Pro processor. The XS-150 runs at 6.7 million instructions per second. The processor package contains the hard disk drive, tape drive and all interface boards.

Main memory can be supplemented with intermediate speed cache memory up to 8M bytes per board. The Whetstone Ally also provides direct memory execution overlap.

The Whetstone Ally is priced at $28,695 for an eight-port system with 170M-byte disk storage and 120M-byte tape storage.

Integrated Digital Products, 4208 E. La Palma Ave., Anaheim, Calif. 92807.

■

IBM has announced additions and enhancements to its **4730 Personal Banking Machine** family.

Models 51 and 52 offer security and vandal-resistant features for cash and deposit transactions in unattended 24-hour operations. Models 11 and 12 incorporate functions of Models 51 and 52 but were designed for attended operations.

The 4730 machines now support Binary Synchronous Communications with host processors as well as Synchronous Data Link Control protocols. The enhanced IBM 4736 offers express cash convenience at indoor locations.

Prices for the 4736 range from $17,000 to $19,000; prices range from $22,000 to $63,000 for the 4730 models.

IBM, Old Orchard Road, Armonk, N.Y. 10504.

Data storage

EMC Corp. has enhanced its **HXP-400** series memories for Hewlett-Packard Co. HP 3000 computer systems.

The enhancement consists of using 120-nsec dynamic random-access memory chips on the cards instead of 150-nsec chips, reducing access time.

The HXP-400 cards are compatible with HP 3000 Models 39 through 58 and come in 1M-, 2M- and 4M-byte models.

The EMC 4M-byte HXP-404 lists for $17.800; the 2M-byte HXP-402 costs $9,900; and the 1M-byte HXP-401 costs $5,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

Printers/plotters

Lexi Data & Communications has announced **Printmate**, a printer interface for Digital Equipment Corp.-compatible computers.

Printmate operates on most impact, laser and matrix printers. It utilizes the entire LQP-02 input emulation protocol.

Printmate is priced at $495.

Lexi Data & Communications, Suite 130, 2102 Business Center Drive, Irvine, Calif. 92715.

Power supplies

Cherokee International, Inc. has introduced the **QT6-D1** and the **QX9-H2**, two triple-output switchers.

Both units feature fully regulated outputs, input surge current limit, brownout protection and complete overload, overvoltage and reverse voltage protection.

The QT6-D1 is rated at 150W convection cooled and 175W forced-air cooled; the QX9-H2 is rated at 250W and 325W, respectively.

In 100-piece quantities the QT6-D1 is priced at $180, and the QX9-H2 is priced at $299.

Cherokee International, 8 Autry, Irvine, Calif., 92714.

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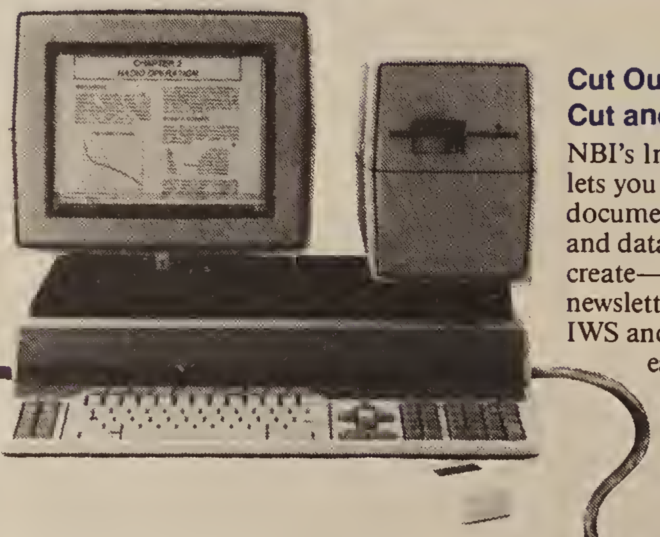

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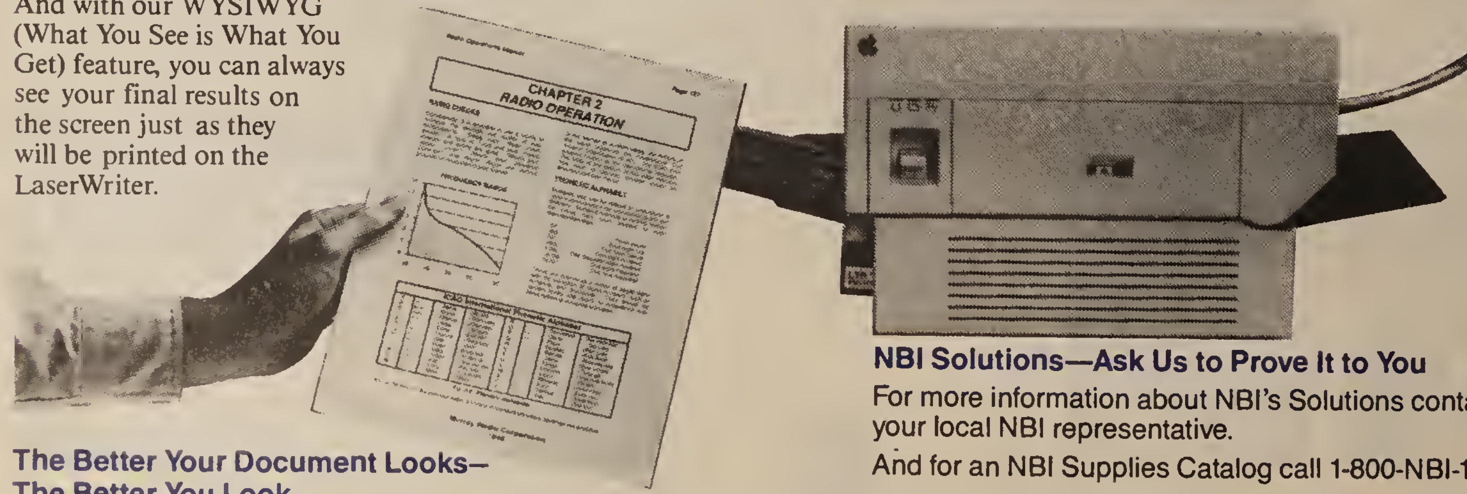

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COMPUTER INDUSTRY

ACTIVE ISSUES

Seasonal sales aid micro mart

By Kathy Porteus

Gone are last year's excess inventory problems and the disruptive influence of IBM's PCjr. Unit sales of microcomputers sold through retail channels, despite being down from 1984 levels, are reportedly better than expected.

Although there is more good news than bad, analysts remain mixed about the outlook for Apple Computer, Inc., Commodore Business Machines, Inc. and Tandy Corp., which are the companies most affected by holiday sales. Personal computer manufacturers such as IBM and Compaq Computer Corp., which sell primarily to business or professional users, generally experience a seasonal swing but not nearly as dramatic as that affecting vendors of so-called "home" computers.

According to Infocorp, a Cupertino, Calif.-based research firm that monitors monthly retail computer sales, approximately 50% of computer sales for personal, nonbusiness applications occur in the Christmas quarter.

Nevertheless, John Girton, a securities analyst with Birr, Wilson & Co. of San Francisco, recently removed Apple from his buy list. "Apple's price per share [trading in the $20 range]," Girton says, "is reflecting a fairly good Christmas. . . Yet the volatility or risk level of the stock is rather high right now."

"The big question on Apple," says Michele Preston, senior vice-president

See **SEASONAL** page 44

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Paradyne indicted for fraud

Federal suit stems from charges of attempted bribery in firm's bid to land multimillion dollar SSA contract

By Bryan Wilkins

WASHINGTON, D.C. — Paradyne Corp., a Largo, Fla., data communications concern, was hit with a 14-count indictment against the company and seven current and former officials by a federal grand jury in Tampa, Fla.

The indictment charged Paradyne with conspiracy to bribe government officials and defraud the Social Security Administration (SSA) with regard to a 1981 contract to supply data communications terminals to the government agency. The indictment charged Robert S. Wiggins, Paradyne's chairman, with giving false testimony and obstructing justice during an SSA investigation of the contract.

The trouble-plagued contract between Paradyne and the SSA has been the focus of several investigations, including those by the Securities and Exchange Commission (SEC), the Department of Justice and the General Accounting Office — a congressional investigative arm working for congressional committees — in addition to the SSA's own internal examination.

Paradyne labeled the charges "outrageous and so lacking foundation as to be ludicrous." The company said it would fight the charges in court. Three months ago, Paradyne settled out-of-court civil charges brought by the SEC alleging "fraud and deceit" to obtain the contract.

Paradyne had vigorously defended the performance of the data terminals as meeting the terms of the contract it signed with the SSA. Officials of the SSA told Congress

See **PARADYNE** page 42

INDUSTRY NOTES

AMD reports plan to restore pay cuts

Anticipating some good news this quarter, **Advanced Micro Devices, Inc.** (AMD) told employees recently that AMD **pay cuts** implemented earlier this year would be rescinded in January if the company experiences a sales increase and fewer losses. Prior to the company's two-week holiday shutdown, AMD spokesman **Andy Rothman** told *Computerworld* the company set no guidelines as to how much sales must improve or losses decrease before full pay levels could be restored. "We're talking about a reasonable sales increase and fewer losses at the operating level," he said.

See **NOTES** page 44

Adapso moves to ease tensions

By Maura McEnaney

WASHINGTON, D.C. — The Association of Data Processing Service Organizations, Inc. (Adapso) is attempting to ease tensions between software vendors and microcomputer users miffed over Adapso's actions to stamp out software copyright violations.

Adapso is in the early stages of forming a customer advisory board that it hopes will be able to promote better relations between vendor and user communities. According to Adapso's David Sturtevant, the board will consist of approximately 20 users representing groups like the Micro Managers Association, school districts and organized personal computer user groups.

"We have spent the last 12 months pushing the piracy issue, and we have an

See **ADAPSO** page 42

INSIDE

Sun Microsystems sues Micron Technologies for allegedly delivering faulty dynamic RAM chips/**42**

Harris merges its analog and digital products divisions, eliminating 100 positions in the process/**44**

INSTANT ANALYSIS

"Ameritech's commitment is to be the Midwest's premier supplier of communications products and services."

— Ameritech Chairman and CEO William L. Weiss, commenting on the company's decision to earmark half of its 1986 capital budget for fiber-optic and digital switching and transmission systems

Software publishers snub colleague as piracy promoter

Group witholds award for best-selling program

By Peggy Watt

WASHINGTON, D.C. — The sticky specter of user-hated copy protection and software piracy paranoia reverberated through the recent snub by the national Software Publishers' Association (SPA) of a successful product.

The board of the 140-member organization of microcomputer industry developers denied Central Point Software of Portland, Ore., certification under its gold award honoring best-selling software.

Central Point's program qualified by selling more than the requisite 100,000 copies, but because Central Point's indisputably popular Copy II series was designed to enable users to copy most copy-protected disks, uneasy board members voted thumbs down "to protect the integrity of the certification program."

Felt hostility from SPA members

Central Point President Mike Brown said he felt so much hostility from fellow SPA members that he left the organization's conference, not only without the expected award, but before appearing as a scheduled speaker.

SPA Executive Director Kenneth A. Wasch said the incident was an unanticipated exception to the simple rules of the organization's new certification program. He said the board required only an impartial audit verifying sales for a product to get an award but had also left a loophole "to reserve the right to make certain judgment calls."

A copy-protection-breaking program, according to Wasch, is "not the type of program the board intended to be eligible for the award."

Brown said he is still a member of the association and supports many SPA activities but sees the snub as an overly defensive blow by developers against problems they fear but cannot fight. His product is more than a convenient utility, he said. It represents a philosophy about serving the computer user.

"Not every illegal copy made is a lost sale," he said. "There's a difference between what people are willing to own and what they're willing to buy."

Used to rejection

Central Point is not unfamiliar with rejection, having had several major distributors refuse to carry its products.

"By conventional wisdom, we shouldn't be in business," Brown said of the company that did more than $6 million worth of business this year.

"I believe piracy is wrong and a problem to be solved, but I don't believe copy protection is the way to do it," he said.

Wasch denied some observers' charges of censorship by the board. "We believe the widespread use of this product will reduce the growth of the industry," he said.

Krag Brotby, president of Vault Corp., Westlake Village, Calif., which designs copy-protection schemes and is currently involved in a court battle against another manufacturer of copy-protection-breaking programs, called the SPA's denial of an award for Central Point appropriate.

He said the decision jibes with the organization's fight against software piracy and to give certification would have been an uneasy juggle.

Sun sues Micron over chip deal

By Maura McEnaney

SANTA CLARA, Calif. — Workstation manufacturer Sun Microsystems, Inc. is seeking $5 million in damages from Boise, Idaho-based Micron Technologies, Inc. over what it claims were faulty Micron 64K-byte dynamic random-access memory (RAM) chips delivered in October 1984.

Both Sun and Micron officials would not comment on the suit, filed recently in California Superior Court in Santa Clara County and later moved to the U.S. District Court in San Jose, Calif.

The six-count complaint, which includes charges of fraud and breach of contract, claims that problems with the Micron chips caused the company to halt temporarily production of its product line earlier this year. "The shutdown resulted in temporary layoffs of Sun employees and prevented Sun from filling customer orders," the complaint said.

The suit also claims that potential customers told Micron there were problems with its 64K-byte dynamic RAM chips but that Micron still sold Sun its product. Memory boards containing Micron chips and inserted into Sun workstations failed 85 times more often than chips purchased from other vendors, according to the suit.

As a result, the suit said, the company was forced to buy chips from another manufacturer, leaving Sun with "substantial, unrecovered out-of-pocket expenses for defective equipment and lost profits and damage to its reputation and goodwill." Sun is seeking an additional $890,000 to recoup those expenses.

Motorola files trade secret lawsuit against Mostek

DALLAS — Motorola, Inc. recently filed a $20 million lawsuit against United Technologies Corp.'s former Mostek Corp. unit, charging Mostek with spilling proprietary trade secrets regarding 68000 series microprocessor chips while it produced them for Motorola.

Filed in U.S. District Court, the suit claims that Mostek conveyed the product information to the federal government during a 1981 contract bid and recently to Thomson S.A. during negotiations about Mostek's future. Thomson, the French-owned electronics giant, recently purchased the loss-plagued chip unit from United Technologies [CW, Nov. 11].

Motorola cut off Mostek as a second-source supplier of 68000 series chips in early November when it learned that United Technologies planned to close the Carrollton, Texas-based Mostek.

The suit requests the federal court to place Mostek's assets in a trust fund until the case is resolved.

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Adapso moves to ease tensions

From page 41

impression that the practice of copying software has been significantly reduced," Sturtevant said. But Adapso's move last year to sue users suspected of copying software created bad feelings among some users who said they feel they are already being shortchanged by vendors with shrink-wrap licenses, maintenance agreements and low product quality, he noted.

The new advisory board was designed to give both sides a chance to iron out some of their differences, Sturtevant said. "We don't want to dismiss the fact that a portion of the population is concerned about quality issues," he said. Representatives from IBM, Micropro International Corp. and Ashton-Tate are among those scheduled to address the committee, he noted.

In other action, Adapso is still waiting on a decision from the U.S. Department of Justice on its efforts to establish a set of hardware and software standards for the addition of a software security "lockbox."

According to Adapso attorneys, the group is awaiting word from the Justice Department that its attempts to establish such standards are not in violation of any antitrust regulations. The request has been in the hands of the Justice Department for a year.

Paradyne indicted for fraud

From page 41

that they altered the original specifications of the Paradyne contract after the terminals faced initial problems in performance but said that the SSA was satisfied with the performance.

Last month, the SSA renewed a one-year contract, valued at $12.4 million for 1986, with Paradyne to support the terminals while it completes an analysis of bid proposals to install a new data communications system to be located at the SSA's processing center in Baltimore, Md.

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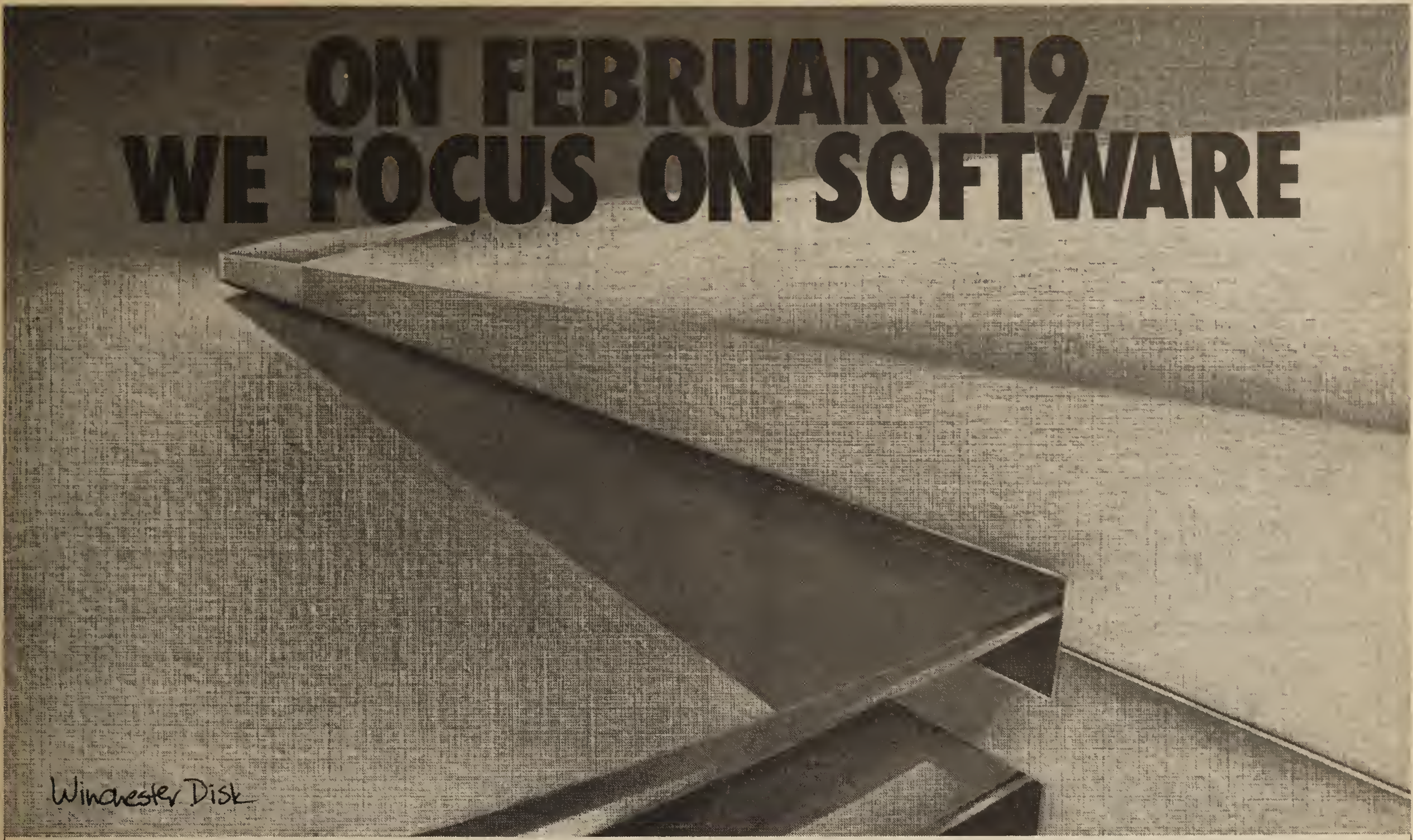

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Harris combines analog, digital product divisions, cuts 100 jobs

By James A. Martin

MELBOURNE, Fla. — Harris Corp. earlier this month merged its analog and digital products divisions and eliminated some 100 administrative positions in an effort to reduce costs and "avoid duplication of managements," a company spokesman said recently.

The two divisions were merged to form the New Products Division, but no change in existing product lines is expected.

The Analog Division was responsible for manufacturing analog circuits for telecommunications, multiplexers and data conversion, among several other areas.

The Digital Division manufactured CMOS microprocessors and peripherals, static random-access memory and bipolar and CMOS programmable read-only memory chips.

Production of the newly formed division will "reflect demand, which is not great because of the decline in the industry," said Jim Murphy, manager of public relations.

Unaffected by the merger were the Harris Microwave Semiconductor and Custom Integrated Circuits divisions as well as Matra-Harris, the company's joint venture concern for semiconductor production.

Notes: Lotus appoints exec

From page 41

Lotus Development Corp. appointed **Michael E. Kolowich** to a new position, **corporate vice-president of marketing**. It is the first computer industry job for Kolowich, 33, after his five years at **Boston-based** consulting firm **Bain & Co.**

■

Televideo Systems, Inc. announced its **first quarterly profit** in more than a year, earning $412,000, or 1 cent per share, in the fourth quarter ended Oct. 31. The profit was accompanied by a **revenue drop** from $30.5 million in the year-earlier period to $25.4 million, reflecting Televideo's cost retrenchment and move of nearly all of its manufacturing to the **Far East**.

For the full year, Televideo lost $19.2 million, or 46 cents per share, compared with a profit of $4.5 million, or 11 cents per share, in 1984. The company's sales dropped from $163 million to $103.1 million.

■

Proteon, Inc., a Natick, Mass.-based maker of **token-ring local-area networks**, appointed **Frances Scricco** to the position of **president and chief executive officer**, a post that had been vacant since August. Scricco is a former general manager of General Electric Co.'s commercial electronics products department. **Paul Rosenbaum**, who had been Proteon's president and CEO, left the company to "pursue other interests," Proteon said.

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From page 41

with L. F. Rothschild, Unterberg Towbin, "is how successful its new product strategy is going to be, and I don't think we will know that for at least six months." Preston, who estimates Apple will earn 60 cents per share this quarter, says she views Apple as a trading opportunity, based on a good Christmas for the company.

According to John Dean, senior securities analyst with Montgomery Securities, Apple is having a better Christmas than the company originally expected. Dean recommends Apple because he expects that, short-term (1 to 3 months), the stock "can still move into the mid-$20s."

"Within 12 months," Dean continues, "assuming that there are solid announcements in the first-quarter time period, I think Apple can certainly move back to the $30 price point that we saw a year ago."

This Christmas, Commodore will likely sell as many computers as the company anticipated, according to Robert T. Cornell, first vice-president with Paine Webber, Inc. Commodore is selling two new products this year: the C-128, which succeeds the C-64; and Amiga, which features advanced graphics capabilities and 256K bytes of memory.

But Commodore's holiday sales mix will be "biased toward the [lower cost] C-64, which is selling surprisingly well, rather than the C-128," Cornell says. As a result, Cornell suggests that Commodore's December quarter profits will not be as robust as, for example, Apple's profit margins.

Most analysts expect Commodore, which has not posted a profit since the quarter ended December 1984, to break even in the current quarter. Regarding Commodore's outlook, Cornell maintains that the "C-128 is now more important than Amiga in terms of sales and profit dollars."

By most accounts, Tandy is staging a comeback after 18 troubled months. So far this Christmas season, Tandy has indicated that its Model 1000 is selling above company expectations. According to Preston, Tandy's stock reflects "increasing confidence in what Tandy is doing and should continue to go up."

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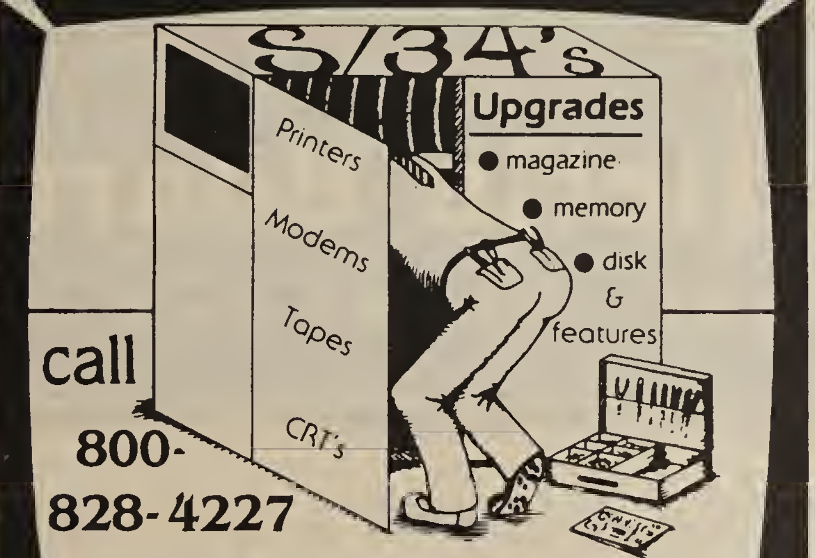

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Denmark: Preben Engell, Computerworld/Denmark, Torvegade 52, 1400 Copenhagen K. Phone: 01-955695. Telex: 27566 cwdan.

England: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London WCI 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

France: Axel Leblois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 747.12.72. Telex: 613234 F.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.1, Via Rosellini 12, 20124 Milano.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Norway: Mr. Morton Hansen, Gen. Mgr., CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 7647725.

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6519690. Telex: (928) 401205.

Southeast Asia: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Melvyn Bennett, Regional Sales Mgr., Asia Computerworld Pte. Ltd., 2023 Swire House, 9 Connaught Rd. Central, Hong Kong. Phone: 210395. Telex: (780) 72827 HX COMWR.

Spain: Neil Kelley, Computerworld/Espana, Barquillo 21, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Sweden: Bengt Marnfeldt, Nova Media AB Sodra Hamnvagen 22. S-115-41 Stockholm. Phone: 46-8-67-91-80. Telex: 14904 NOVACW.

The Netherlands: Wout Berends, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Venezuela: Kalman Von Vajna Nagy, CW Communicaciones CRL Torre Maracaibo, piso 13, Oficina H, AV. Libertador, Caracas. Phone: 72-76-30.

West Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

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Computerworld Sales Offices

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Manager/Marketing & Sales Operations/Kathy Doyle
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Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES Vice President, Edward P. Marecki. **Manager/Marketing & Sales Operations**, Kathy Doyle. **National Recruitment Sales Manager**, Al DeMille. **Display Advertising Manager**, Anne Hadley. **Senior Coordinator**, Carolyn Medeiros. **Display Advertising**, Maureen Carter, George W. Griffin, Joy Forman. **Classified Operations Manager**, Cynthia Delany.

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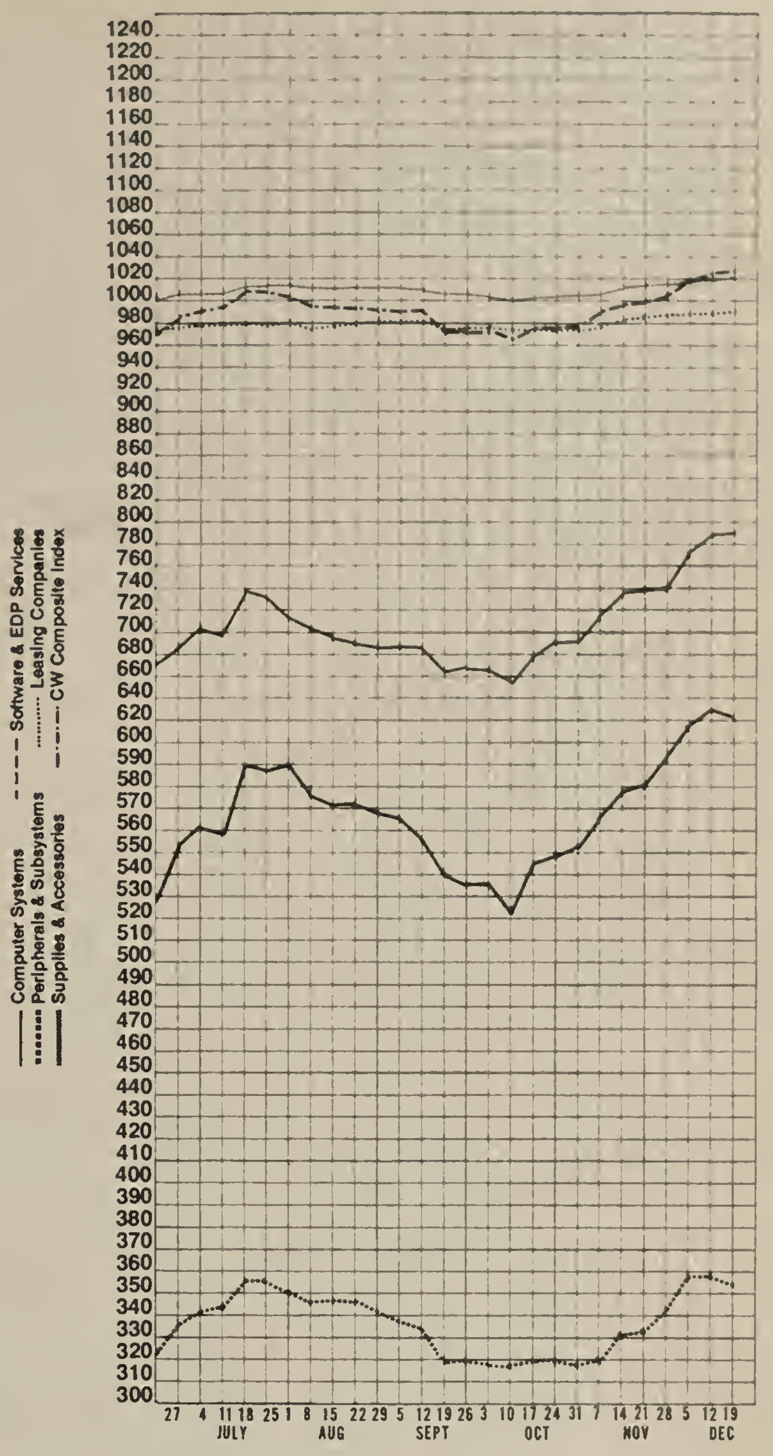
Computerworld Stock Trading Index



TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 18, 1985

All statistics compiled computed and formatted by
TRADE QUOTES INC
Cambridge Mass 02139

COMPUTER SYSTEMS

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	5- 9	6 3/8	+ 3/8	+6.2
O	ALTOS COMPUTER SYST	8- 14	12 7/8	0	0.0
A	AMDAHL CORP	10- 18	13 1/8	- 1/8	-0.8
O	APPLE COMPUTER INC	14- 31	22 1/4	+2 1/2	+12.6
O	APOLLO COMPUTER	9- 31	13 1/2	-1 1/4	-8.4
N	AT&T	19- 28	24 3/4	+ 3/8	+1.5
N	BURROUGHS CORP	52- 68	62 5/8	+ 5/8	+1.0
O	COMPAQ COMPUTER CP	5- 14	12 3/8	-1 3/4	-12.3
O	COMPUTER AUTOMATION	1- 9	1 7/8	- 1/8	-6.2
A	COMPUTER CONSOLES	5- 14	7	+ 1/8	+1.8
N	CONTROL DATA CORP	15- 39	20 1/2	+1 1/8	+5.8
O	CONVERGENT TECHNOL	5- 12	11 3/8	- 5/8	-5.2
O	CPT CORP	5- 8	6 1/8	+ 1/4	+4.2
N	CRAY RESEARCH INC	25- 71	62 3/4	-4 3/4	-7.0
O	DAISY SYSTEMS CORP	21- 38	28 1/4	-1 3/4	-5.8
N	DATA GENERAL CORP	31- 78	46 1/8	-3 1/2	-7.0
N	DATAPOINT CORP	5- 22	5 1/4	+ 1/8	+2.4
N	DIGITAL EQUIPMENT	85-137	129 1/2	-3 1/4	-2.4
A	EECO INC	13- 16	15 1/2	+ 1/8	+0.8
N	ELECTRONIC ASSOC.	3- 6	4 1/4	- 1/8	-2.8
N	FLOATING POINT SYST	18- 37	35 3/8	- 3/8	-1.0
N	FOXBORO	22- 31	25 3/4	- 3/4	-2.8
N	GOULD INC	20- 38	29 7/8	-1 1/8	-3.6
N	HARRIS CORP	22- 35	27 1/2	+ 1/2	+1.8
N	HEWLETT-PACKARD CO	29- 39	36 1/2	-1 1/8	-2.9
N	HONEYWELL INC	54- 87	77 1/2	+4	+5.4
N	IBM	117-155	152 7/8	+3 7/8	+2.6
O	IPL SYSTEMS INC	1- 4	1 1/2	+ 1/4	+20.0
N	ITT CORP	28- 38	36 1/4	+1 1/4	+3.5
N	M/A-COM INC	13- 24	13 3/4	- 1/4	-1.7
N	MANAGEMENT ASSIST	2- 28	3 1/4	- 1/8	-3.7
N	MATSUSHITA ELEC(ADR)	48- 68	64 1/4	+1 1/4	+1.9
O	MENTOR GRAPHICS	13- 30	18	-2 1/4	-11.1
N	MODULAR COMPUTER SYS	6- 8	7 1/4	- 1/8	-1.6
N	MOHAWK DATA SCI	1- 13	2 1/8	+ 3/8	+21.4
N	MOTOROLA INC	29- 41	37 1/2	-1 5/8	-4.1
N	NAT'L SEMICONDUCTOR	10- 15	13	- 5/8	-4.5
N	NBI INC	11- 20	13 1/8	+ 7/8	+7.1
N	NCR	25- 43	40 1/2	+1 3/4	+4.5
N	PERKIN-ELMER	22- 31	29 7/8	- 1/4	-0.8
N	PRIME COMPUTER INC	15- 24	21 3/4	-1 1/4	-5.4
N	SPERRY CORP	38- 59	52 1/2	+ 7/8	+1.6
O	STRATUS COMPUTER INC	9- 25	22 1/4	-1	-4.3
O	TANDEM COMPUTERS INC	13- 29	21 1/4	0	0.0
N	TANDY CORP	24- 42	40 1/4	- 5/8	-1.5
O	TELEVIDEO SYSTEMS	2- 4	3	- 1/8	-4.0
O	TELXON CORP	10- 22	20 1/4	-1 1/2	-6.8
N	TEXAS INSTRUMENTS	86-132	104 3/8	- 5/8	-0.5
A	ULTIMATE CORP	8- 24	21 5/8	+ 1/8	+0.5
O	VECTOR GRAPHICS INC	0- 1	1/8	- 1/16	-19.6
A	WANG LABS "B"	15- 29	20 1/2	- 1/2	-2.3
A	WANG LABS "C"	15- 29	20 1/4	- 3/8	-1.8
N	XEROX CORP	37- 81	58 1/2	-1 1/4	-2.0

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	10- 28	27 1/4	+ 3/4	+2.8
N	CONTINENTAL INFO SYS	5- 15	14 1/8	+ 1/2	+3.8
O	FINALCO GROUP INC	4- 5	4	+ 3/8	+10.3
O	PHOENIX AMERICAN INC	2- 4	3 1/8	0	0.0
O	SELECTERM INC	7- 12	6 3/4		0.0
N	U.S. LEASING	32- 43	38 3/8	+ 1/8	+0.3

COMPONENTS

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	22- 38	28 7/8	-1 7/8	-6.0
O	ADV'D SEMICONDUCTOR	7- 23	10	0	0.0
N	ANALOG DEVICES INC	18- 28	26 1/4	+ 7/8	+3.4
O	ANALOGIC CORP	11- 16	14 1/8	+1 5/8	+13.0
N	APPLIED MAGNETICS CP	9- 16	14	0	0.0
O	HADCO CORP	3- 7	6 3/4	+ 1/4	+3.8
O	MICRO MASK INC	6- 12	7 1/4	+ 1/4	+3.5
N	TERADYNE	17- 33	22 1/2	-2 1/8	-8.6

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 4	3 3/4	0	0.0
N	ADVANCED SYSTEMS INC	9- 18	17 1/4	+ 5/8	+3.7
N	AGS COMPUTERS INC	10- 20	19 1/2	+ 1/2	+2.6
O	AMERICAN SOFTWARE	9- 15	12 1/2	+ 1/4	+2.0
N	ANACOMP INC	2- 4	3 1/4	+ 1/4	+8.3
O	ANALYSTS INTL CORP	5- 11	7 1/4	- 1/2	-6.4
N	APPLIED DATA RES	18- 38	32	+ 1/8	+0.3
O	ASHTON TATE	6- 20	18 3/4	- 1/4	-1.3
O	ASK COMPUTER SYSTEMS	7- 25	12 7/8	+ 3/8	+3.0
B	ASTRADYNE COMP IND	1- 3	1 7/8	+ 1/8	+7.1
N	AUTOMATIC DATA PROC	35- 60	59 1/8	+1 1/2	+2.6
O	COMPUTER ASSOC INT'L	18- 34	33 3/4	+4 1/4	+14.4
O	COMPUTER HORIZONS	5- 13	14 1/4	- 3/8	-2.5
O	COMPUTER NETWORK	6- 9	5 1/2	- 1/8	-2.2
N	COMPUTER SCIENCES	13- 32	31 3/4	+2 3/4	+9.4
O	COMPUTER TASK GROUP	10- 24	23	+2 3/8	+11.5
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMPUTONE SYSTEMS	4- 11	4 7/8	- 5/8	-11.3
O	COMSERV CORP	1- 8	2 7/8	0	0.0
O	COMSHARE	7- 12	11 5/8	+ 1/8	+1.0
N	CULLINET SOFTWARE	13- 33	17 3/8	+1 3/4	+11.1
O	CYCARE SYSTEMS INC	19- 27	19 3/4	+ 3/4	+3.9
O	HOGAN SYSTEM INC	4- 12	6 5/8	- 3/8	-5.3
N	GENERAL ELECTRIC CO	56- 74	71	+3 1/8	+4.6
N	GENL MOTORS E (EDS)	20- 47	42 3/8	+1 1/8	+2.7
N	GTE CORP	38- 48	46	+1 1/4	+2.7
O	INFORMATION SCIENCE	1- 5	1 7/8	- 1/4	-11.7
O	INFOTRON SYSTEMS CP	13- 24	16 1/2	0	0.0
O	KEANE ASSOCIATES	10- 20	15	0	0.0
N	LOGICON	25- 43	42 3/4	+2 1/4	+5.5
O	LOTUS DEVELOPMENT CP	15- 34	22 3/4	-2	-8.0
O	MCI COMMUNICATIONS	7- 11	10 7/8	+ 1/4	+2.3
O	MNGT SCI AMER INC	7- 16	11	+1 1/4	+12.8
O	MATHEMATICAL APP GRP	1- 8	1 1/2	0	0.0
O	MICOM SYSTEMS INC	12- 35	22 1/2	+1 3/4	+8.4
O	MICROPRO INT'L CP	2- 4	2 5/8	+ 1/8	+5.0
O	NATIONAL DATA CORP	8- 18	16 3/4	- 1/8	-0.7
O	ON-LINE SOFTWARE INT	4- 11	9 3/4	+1 1/2	+18.1
O	PANSOPHIC SYSTEMS	14- 27	25 3/8	+1 1/8	+4.6
N	PLANNING RESEARCH	11- 19	16 3/4	- 3/4	-4.2
O	POLICY MGMT SYSTS CP	17- 35	23	+1 3/4	+8.2
O	PROGRAMMING & SYS	4- 9	8	0	0.0
O	REYNOLDS & REYNOLD	31- 51	50 1/2	+1 1/4	+2.5
O	SEI CORP	13- 24	22 3/4	+ 1/8	+0.5
O	SHARED MEDICAL SYST	26- 37	35 1/4	+ 1/4	+0.7
O	SCIENTIFIC COMPUTERS	5- 8	5 1/2	0	0.0
O	SOFTWARE AG	12- 22	17 1/4	+ 3/4	+4.5
N	URS CORP	10- 14	13 1/8	+ 3/4	+6.0
N	UCCEL	11- 17	15 7/8	- 3/8	-2.3
O	VM SOFTWARE	17- 24	21	-2	-8.6

PERIPHERALS & SUBSYSTEMS

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	3- 8	5 5/8	+ 1/4	+4.6
A	ANDERSON JACOBSON	2- 5	2 1/4	+ 1/8	+5.8
O	AST RESEARCH INC	7- 33	27 7/8	-3 7/8	-12.2
O	AUTO-TROL TECHNOLOGY	3- 13	3 3/4	+ 1/4	+7.1
O	AVANT-GARDE COMPUTNG	3- 21	4 3/4	+1	+26.8
O	BANCTEC INC	6- 12	7 3/8	- 3/4	-9.2
O	BEEHIVE INT'L	1- 2	1/4	0	0.0
N	BOLT,BERANEK & NEW	20- 37	35 1/4	-1 1/8	-3.0
O	CAMBEX CORP	1- 3	7/8	0	0.0
N	CENTRONICS DATA COMP	3- 11	4 3/4	+ 1/4	+5.5
A	CETEC CORP	6- 9	7 1/4	+ 1/8	+1.7
A	COGNITRONICS	4- 7	3 7/8	+ 1/8	+3.3

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	24- 38	27 3/8	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	5/8	0	0.0
N	COMPUTERVISION CORP	9- 44	12 1/8	-1	-7.6
N	CONRAC CORP	12- 19	14	- 1/2	-3.4
A	DATAPRODUCTS CORP	11- 20	16 1/2	+ 1/8	+0.7
A	DATARAM CORP	4- 8	8 7/8	0	0.0
O	DATA SWITCH CORP	4- 9	6 5/8	- 1/4	-3.6
O	DATUM INC	5- 9	5 1/8	+ 1/8	+2.5
O	DECISION DATA COMPUT	10- 20	11	-1 1/8	-9.2
O	ENDATA, INC	2- 8	3 5/8	0	0.0
O	EVANS & SUTHERLAND	12- 21	18	+ 1/8	+0.6
O	GANDALF TECHNOLOGIES	5- 13	7 1/2	0	0.0
N	GEN'L DATA COMM IND	8- 21	11 7/8	- 5/8	-5.0
N	HAZELTINE CORP	20- 30	24	- 5/8	-2.5
O	ICOT CORP	3- 8	7 7/8	+ 1/4	+3.2
O	INFORMATION INTL INC	10- 17	13 1/4	+ 3/8	+2.9
O	INTECOM INC	4- 11	4 3/4	- 3/4	-13.8
O	INTEL CORP	21- 33	28 3/4	-1 1/4	-4.1
A	LUNDY ELECTRONICS	10- 15	12 3/4	- 5/8	-4.6
O	MEGADATA CORP	3- 8	3 3/8	- 3/4	-18.1
A	MSI DATA CORP	7- 13	10 1/4	+1 1/4	+13.8
N	NASHUA CORP	24- 30	29 1/4	+1 3/4	+6.3
O	NETWORK SYSTEMS CORP	18- 27	23 1/8	- 3/8	-1.5
N	NO AMERICAN PHILIPS	32- 45	38 3/4	+ 5/8	+1.8
N	NORTHERN TELECOM LTD	31- 41	34 1/4	- 3/8	-1.0
O	OMEX	1- 3	1/2	0	0.0
N	PARADYNE CORP	7- 18	6 1/2	-2 3/4	-29.7
A	PENRIL CORP	7- 14	7 3/8	+ 3/8	+5.3
N	PLESSEY CO (ADR)	19- 28	25 1/4	- 3/4	-2.[illegible]
O	PRINTRONIX INC	9- 18	13	0	0.0
O	QMS INC	8- 16	9	+ 1/8	+1.4
O	RAMTEK CORP	2- 7	3 1/4	0	0.0
N	RECOGNITION EQUIP	9- 17	12 5/8	-1 1/8	-8.1
N	SANDERS ASSOCIATES	30- 44	37 5/8	+ 5/8	+1.[illegible]
O	SCAN-TRON CORP	9- 16	15	+2	+15.3
N	SCIENTIFIC ATLANTA	10- 15	11 5/8	+ 1/8	+1.0
O	SEAGATE TECHNOLOGY	5- 9	7	+ 1/8	+1.9
N	STORAGE TECHNOLOGY	1- 4	1 3/4	0	0.0
O	SYKES DATATRONICS	0- 2		- 1/16	-25.5
A	T BAR INC	5- 9	5 1/4	- 1/4	-4.5
A	TAB PRODUCTS CO	14- 21	18 1/4	0	0.0
O	TANDON CORP	3- 8	4 1/8	+ 1/8	+3.1
A	TEC INC	7- 13	7 1/8	+ 1/8	+1.7
N	TEKTRONIX INC	47- 68	56 1/2	+1	+1.8
N	TELEX	34- 60	58	-1 1/2	-2.5
O	TESDATA SYSTEMS CP	0- 3	1 1/8	- 1/8	-10.0
N	TIMEPLEX INC	15- 23	21 1/4	+ 1/2	+2.4
N	TITAN CORP	4- 10	8 1/2	+ 7/8	+10.1
O	VISUAL TECHNOLOGY	1- 3	3/4	- 1/16	-7.8

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)	CLOSE DEC 18 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	21- 34	32 3/4	+ 1/2	+1.5
N	BARRY WRIGHT	17- 29	21 3/8	+1 7/8	+9.6
A	DUPLEX PRODUCTS INC	13- 22	20 3/4	- 5/8	-2.9
N	ENNIS BUS. FORMS	14 24	23	+ 1/4	+1.0
N	3M COMPANY	74- 92	89	+ 1/8	+0.1
N	MOORE CORP LTD	15- 22	2[illegible] 5/8	- 1/8	-0.6
O	STANDARD REGISTER	22- 39	35	-1	-2.7
N	WALLACE COMP SERVICE	30- 41	40	+ 1/8	+0.3

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